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BULLETIN

OF THE

Harvard University.

MUSEUM OF COMPARATIVE ZOÖLOGY

AT

HARVARD COLLEGE, IN CAMBRIDGE.

VOL. XLIII.

CAMBRIDGE, MASS., U. S. A.
1904–1908.

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University Press:
John Wilson and Son, Cambridge, U.S.A.

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AT HARVARD COLLEGE.
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V.

REPORTS ON THE CEPHALOPODA.

BY WILLIAM E. HOYLE.

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WITH TWELVE PLATES.

CAMBRIDGE, MASS., U. S. A.:
PRINTED FOR THE MUSEUM.
MARCH, 1904.

No. 1. — *Reports on the Dredging Operations off the West Coast of Central America to the Galapagos, to the West Coast of Mexico, and in the Gulf of California, in charge of* Alexander Agassiz, *carried on by the U. S. Fish Commission Steamer "Albatross" during 1891,* Lieut. Commander Z. L. Tanner, U. S. N., *Commanding.* XXIX.

AND

Reports on the Scientific Results of the Expedition to the Tropical Pacific, in charge of Alexander Agassiz, *on the U. S. Fish Commission Steamer "Albatross," from August, 1899, to March, 1900,* Commander Jefferson T. Moser, U. S. N., *Commanding.* V.

Reports on the Cephalopoda. By William E. Hoyle.

The collection made by the "Albatross" during 1891 came into my hands in the year 1892. In the summer of 1893 I took the specimens to Copenhagen and spent some time studying them in the Zoölogical Museum of that city. I had then the pleasure and privilege of discussing the more interesting forms with the *doyen* of students of Cephalopoda, Professor Steenstrup, and with his assistant, Dr. Posselt. Both these have since died, but the memory of their ready sympathy and helpful counsel remains and is here gratefully acknowledged. I have also received assistance from my friend Dr. Georg Pfeffer, for which I beg to tender him my sincere thanks.

Some preparations of the luminous organs of *Abraliopsis* were exhibited at the meeting of the German Zoölogical Society at Göttingen in 1893, and also at the British Association in Nottingham in the same year, but after that, owing to the claims arising from the charge of a rapidly growing museum, no further progress was made for some years.

The collection consists of thirty species (including a few forms to which I have not found it possible to affix names), distributed in nineteen genera, one of which (*Froekenia*) is new. Another (*Pterygioteuthis*) was first found by the "Albatross," but its publication has been anticipated by the description of an immature example by Dr. H. Fischer in 1896. There are six species described as new. I have also proposed a new genus (*Pyroteuthis*) for the *Enoploteuthis margaritifera* of Rüppell.

In the preparation of the Plates I have utilized a number of water-color drawings made on the expedition by Mr. Agassiz and Mr. Magnus Westergren whilst the animals were still fresh and the colors of life retained. It would be well if this practice had been followed on other expeditions, as the appearance of Cephalopoda changes very markedly after preservation in alcohol. The other figures are based upon my own sketches, carefully made to scale, and in making the finished drawings I have had the assistance of Miss Mabel B. Ede, Miss E. R. Dust, and Dr. J. H. Ashworth.

In conclusion I have to express my gratitude to Mr. Agassiz for the opportunity of studying such an interesting collection.

I subsequently received a smaller collection made by the "Albatross" during a cruise among the Pacific Islands in 1899–1900, which contained thirteen species, one of which was new to science and forms the type of a new genus, *Cirrobrachium*.

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FAMILY CIRROTEUTHIDAE.

Cirroteuthidae, Keferstein, '66, p. 1447.

This family was defined by its founder Keferstein ('66, p. 1447) as follows: "Körper mit rundlichen Flossen, von weicher Consistenz. Mantel rundum bis zur Trichterbasis mit dem Kopfe verwachsen. Eine knorpelige, breite innere Schale (wahrscheinlich als verwachsene Rückenknorpel anzusehen)." This definition still holds good in all essential points: there might be added to it the words, — "suckers in a single series alternating with paired cirri, radula absent;" and in view of the variety which has since been shown to exist in the form of the internal cartilage, the word "breite" might be advantageously omitted.

Here are included at present the following genera: —

Cirroteuthis. — Dorsal cartilage saddle-shaped; umbrella present, intermediate web present or absent.

Stauroteuthis. — Dorsal cartilage horseshoe-shaped with the free ends directed towards the head; umbrella present, intermediate web present.

Froekenia. — Dorsal cartilage horseshoe-shaped, the free ends directed towards the head; umbrella absent.

CIRROTEUTHIS.

Cirroteuthis Eschricht, '36, p. 627.

The species of this genus hitherto known may be discriminated by the annexed key: —

1.	Total length to breadth about 3 : 1	*plena* Verrill.
	Total length to breadth more than 4 : 1	2.
2.	Length and breadth of fin equal to length and breadth of body	*megaptera* Verrill.
	Length and breadth of fin less than length and breadth of body	3.

3.	Intermediate web absent	*pacifica* Hoyle.
	Intermediate web present	4.
4.	Internal cartilage longer than broad	*mülleri* Eschricht.
	Internal cartilage broader than long	*magna* Hoyle.

The characters of *C. umbellata* as given by Fischer (**'83**, p. 402) do not enable me to discriminate between his species and those described by Verrill; in fact, from the account of his two larger specimens it seems not unlikely that they ought to be referred to the genus *Opisthoteuthis* Verrill (**'83**, p. 113). The phrase "le corps . . . était tellement court qu'on ne distinguait, au premier abord, que le disque formé par les bras, et que l'animal rassemblait en quelque sorte à une astérie molle (Hymenaster)." A comparison of this description with the figures of *O. depressa* given by Ijima and Ikeda (**'95**, p. 133) is, to say the least of it, very suggestive.

Since the above was written I have seen Professor Joubin's important work (**:01**) on the collections made by the "Princesse Alice," in which he records the capture of examples identified with *C. umbellata*. He does not seem very certain of this identification, for he speaks of having arrived at it "par exclusion successive," and adds that "les deux ou trois caractères signalés par P. Fischer, . . . s'appliquent bien á l'échantillon de la *Princesse Alice*." It seems to me, however, that M. Joubin overlooks the important account of the general shape just alluded to. In any case a comparison of his figures and descriptions with those given below suggests very strongly that his specimens are the same as the species here called *Stauroteuthis hippocrepium* (see p. 6).

1. Cirroteuthis, sp.

Habitat. — Station 3414, off Tehuantepec, April 8, 1891; lat. 10° 14′ N.; long. 96° 28′ W., 2232 fathoms; green mud: temperature, surface 82°, bottom 35.°8; one specimen, No. 7945 A. [H. 33.][1]

But little is left of this specimen; the head and body have entirely disappeared with the exception of one gill and one eye, and the arms have lost most of their integument and of the umbrella connecting them. So far as can be seen, it agrees in many respects with *C. pacifica* from the "Challenger" Expedition (Hoyle, **'86**, p. 61), the only noteworthy difference being that the nodule which indicates the attachment of the web to the ventral side of the arm is rather less instead of rather more than halfway up the arm, but as the dorsal cartilage was not preserved, it is impossible to say with certainty whether it belonged to the genus *Cirroteuthis* or to *Stauroteuthis*.

2. Cirroteuthis, sp.

Habitat. — Station 3358; off Cape Mala; February 24, 1891; lat. 6° 30′ N., long. 81° 44′ W., 555 fathoms; temperature, surface 83°, bottom, 40.°2; green sand.

---

[1] The numbers in square brackets preceded by "H" refer to my own register of specimens examined.

On the margin of the drawing of specimen 7961 is a memorandum to the effect that the "wire came up with a large film of the violet membrane of tentacles: must have been a large specimen at least × 20 this one." No further record is to be found, and the fragments do not appear to have been preserved.

STAUROTEUTHIS.

Stauroteuthis Verrill, '**79**, p. 468; '**81**, p. 382, Plate 32, Figs. 1–5.

In the "Challenger" Report (Hoyle, '**86**, p. 61), I ventured to throw some doubt on the validity of this genus. The examination of the "Albatross" collection has, however, led me to believe that these doubts were ill founded. The genus presented many obvious resemblances to *Cirroteuthis*, and it appeared quite possible that the recorded differences were due to defects in the preservation of the specimens. The chief points of distinction seemed to be the form and position of the dorsal cartilage and the attachment of the web to the tips of the arms.

With respect to the former I have now no doubt whatever that the horizontal position of the horseshoe-shaped cartilage is normal. This was unquestionably the case in the specimen (No. 7942), which forms the type of *S. hippocrepium* below: it was seen too in the young specimen figured in the "Challenger" Report ('**86**, p. 65, Plate **13**, Figs. 5, 6). In that particular instance I regarded it as a juvenile character, for in the example, which was taken to be a more mature one of the same species, the cartilage seemed to be placed vertically. That specimen was, however, much distorted, and I now incline to the view that the horseshoe-shaped cartilage is normally horizontal, as Professor Verrill has figured it in the type of his genus.

To the genus *Stauroteuthis* I should now refer the following species which may be thus diagnosed: —

1. *S. syrtensis:* "cartilage forming a median angle, directed backward": fins triangular; umbrella reaching equally up dorsal and ventral aspects of the arm; no nodule where the free edge of the web joins the ventral aspect of the arm; intermediate web present.[1]

2. *S. meangensis:* cartilage horseshoe-shaped with angular process on the outer aspect of the curve; fins long, narrow, and pointed; umbrella extending only four-fifths up the ventral aspect of the arm and provided with a nodule where it joins the arm; intermediate web absent.

3. *S. hippocrepium:* cartilage horseshoe-shaped, smooth externally; fins paddle-shaped; umbrella extending nearly halfway up the ventral aspect of the arm, and provided with a nodule at the point of union; intermediate web absent.

---

[1] By "intermediate" web is meant a membrane which joins the arms to the umbrella.

3. Stauroteuthis hippocrepium, sp. n.

(Plate 1, Fig. 1; Plate 2, Fig. 1; Plate 3, Figs. 1–4.)

Habitat. — Station 3374, southwest of Malpelo Island; March 3, 1891; lat. 2° 35′ N., long. 83° 53′ W., 1823 fathoms; green ooze; temperature, surface 80°, bottom 36.°4; one specimen, No. 7942. [H. 47.]

The Body is ovoid, about half as long again as broad; the *mantle-opening*, as usual in the genus, closely surrounds the base of the *siphon*, which is comparatively small and subulate. What remains of the *fins* (Plate **3**, Fig. 2) is muscular, flattened, pointed, and directed outwards and forwards; at the base of each is a gently hollowed, subtriangular surface, which during life articulated with the external surface of the anterior end of the dorsal cartilage (Plate **3**, Fig. 3). There are, however, traces of a membranous expansion on the anterior edge of the fin. The *dorsal cartilage* is horseshoe-shaped (Plate **3**, Fig. 1) and disposed in the horizontal plane of the body, with the concavity directed forwards: its surface is smooth, without any characteristic markings or prominences.

The Head is so macerated that no description of it is possible.

The Arms are subequal, and rather stout, soft, and tapering, rounded on the aboral aspect, wedge-shaped on the oral, the row of suckers occupying the narrow end of the wedge. All have lost their tips so the measurements given are merely approximate; their original length, however, would be from 5 to 10 mm. greater than the dimensions here given. The *umbrella* is entirely wanting, but it appears to have been attached directly to the arm, so that there was no intermediate web. It is impossible to ascertain how far the web extended on the dorsal side of the arm, but on the ventral its attachment terminated nearly halfway up the arm about the 25th sucker, as is shown by the presence in that position of a horny induration (Fig. 4) somewhat resembling that in *S. meangensis* (Hoyle, **'86**, Plate **11**, Fig. 2). The *suckers* are upwards of 50 in number, and of the usual form, the largest being just over 1 mm. in diameter. The *cirri* are very small and begin as minute papillae only perceptible with a lens between the fourth and fifth suckers; they extend up the arms beyond the attachment of the web on the ventral aspect, but how much further it is impossible to say.

The *color*, when captured, is shown in Plate **1**, Fig. 1, Plate **2**, Fig. 1.

Dimensions.

	mm.
Length, total	about 80
End of body to mantle-margin	23
Breadth of body	20
Breadth of head	22
Length of fin[1]	28
Breadth of fin (at origin)	13
Diameter of largest sucker on arm	1.2

---

[1] The length of the fin is measured from the root outwards towards the tip.

	Right.	Left.
Length of first arm	80+	90+
Length of second arm	75+	85+
Length of third arm	70+	85+
Length of fourth arm	65+	75+

Fortunately two excellent colored drawings were made of this specimen when it was captured, which give a much better idea of its general appearance than could be obtained from the sadly mutilated creature which came into my hands. The animals of this family seem particularly difficult to preserve, whether it is that their gelatinous tissues are not easily permeated by the alcohol or what the cause may be I know not, but no single well-preserved example of this family has ever come into my hands.[1] In the present instance the body was much decomposed, especially on the dorsal aspect, where the integument and subjacent tissues had entirely disappeared, leaving the cartilage *in situ*, but with its upper surface clearly exposed to view (Plate **3**, Fig. 2) in such a way as to leave no doubt as to what was its normal position. The significance of this in reference to the generic position of the species I have already dwelt upon.

I have remarked above that the figures and description of the examples called by M. Joubin (:**01**) *Cirroteuthis umbellata* present a very striking resemblance to the species just described. This identification does not rest on a comparison with the type, and seems to me to be at variance with an important passage in Fischer's all-too-short diagnosis. Unfortunately M. Joubin gives no account of the form or position of the internal cartilage, which would furnish important evidence for or against the view here suggested.

FROEKENIA, g. n.[2]

Allied to *Cirroteuthis*, with paired fins at the sides, but with no connecting membranes between the arms.

4. **Froekenia clara**, sp. n.

(Plate 2, Fig. 2; Plate 3, Fig. 5.)

Habitat. — Station 3358, off Cape Mala, February 24, 1891; lat. 6° 30′ N., long. 81° 44′ W., 555 fathoms; green sand; temperature, surface 83°, bottom 40.°2. One specimen, No. 7961. [H. 50.]

The Body is ovoid, broadest just in front of the fins, tapering slightly towards the hinder extremity. The *fins* are about equal in length to the breadth of the body, sub-elliptical in shape, the posterior margin almost straight, the anterior more curved. The *internal cartilage* (Plate **3**, Fig. 5) lies in a horizontal plane around the hinder end of the body; it is almost semicircular, delicate and transparent, and pointed at the extremities; on the external surface near the extremity is a facet with which the base of the fin articulates; the long axis of the fin is directed somewhat forward with respect to the median axis of the cartilage.

---

[1] Verrill ('**96**, p. 75, footnote) mentions that satisfactory results may be obtained by the use of a refrigerator.

[2] From the Danish word "Frøken," in honor of a lady to whose help I am indebted for much of the leisure utilized in preparing this Report.

The Head is short; the eyes prominent, standing out somewhat further than the sides of the body.

The Arms are long, slender, and sub-equal, and taper very gradually to their ends, but as these were in many instances mutilated, it is impossible to give accurate dimensions: the length was, however, about 5–6 cm. The *suckers* are small, placed in a single series, very closely set, and of firm consistency, embedded in much soft connective tissue and not in the muscular substance of the arms. Most of the suckers were lost, and it was only here and there that I could find traces of the *cirri* alternating with them: those I did find were a little longer than the diameter of the suckers, and rather stout and blunt.

The *Color*, when alive, is shown in the sketch reproduced on Plate **2**, Fig. 2.

The solitary specimen on which this species is based came into my hands in a state approaching disintegration and fell to pieces under very careful handling. The characters which I was able to decipher are, however, quite sufficient to prove that it cannot be placed in any genus yet known. Fortunately a sketch, partly colored, was made of the animal immediately after its capture, which, reproduced in Plate **2**, gives the form and proportions of the animal much more clearly than could be ascertained from the preserved specimen. On the margin of the drawing is a memorandum by Mr. Agassiz to the effect that the creature was "like *Cirroteuthis*, but no film" (umbrella). This statement is very important, for it proves that the absence of the umbrella is not due to defective preservation.

FAMILY ALLOPOSIDAE.

Alloposidae, Verrill, '**81**, p. 365.

BOLITAENA.

Bolitaena, Steenstrup, '**59**, p. 183.

Although this generic name was published and very briefly characterized more than forty years ago (Steenstrup, '**59**, p. 183), the type was first described in the "Challenger" Report (Hoyle, '**86**, p. 16) from notes made in the Copenhagen Museum. It was then placed by me in the family Polypodidae (Octopodidae) along with *Eledonella* and some other forms, but on reconsidering the question in connection with the specimen to be described below I have come to the conclusion that its affinities are rather with the genus *Alloposus*. It shares with this the soft gelatinous consistency, the short rounded body, the relatively extensive umbrella, the large siphon, attached for its whole length to the inferior surface of the head, and the ligament attaching the margin of the mantle to the body in the middle line and passing just under the posterior edge of the siphon (compare Verrill, '**81**, Plate **39**, Fig. 2). The chief distinction is that it has only a single row of suckers, but I think this is hardly sufficient to outweigh the numerous points of resemblance. The genus may perhaps be regarded as having the same relation to *Alloposus* that *Moschites* (*Eledone*) has to *Polypus* (*Octopus*).

5. Bolitaena microcotyla.

(Plate 3, Figs. 6-11; Plate 4, Fig. 1.)

Bolitaena microcotyla, Steenstrup, '**59**, p. 183.
" " Hoyle, '**86**, p. 16.

Habitat. — Station 3410, off Bindloe Island, 4 miles W., April 3, 1891; lat. 0° 19′ N., long. 90° 34′ W., 331 fathoms; black sand; temperature, surface 82°, bottom 44.°2; one specimen, No. 7955. [H. 55.]

This occurrence extends the known range of the genus, for the type species is from the Atlantic. The locality of a specimen in the Hamburg Museum, shown me by Dr. Pfeffer, is unknown.

In general appearance this young specimen resembled a spheroidal mass of jelly barely 2 cm. in diameter; on turning it about there were seen on one side several rows of suckers and on the other a deep transverse groove, whilst at opposite poles were two large eyes shining through the integument. The photographs reproduced on Plate **3** give an idea of the general appearance, whilst the semi-diagrammatic side-view (Fig. 10) shows more clearly the disposition of the parts.

The Body and *Head* have no line of demarcation between them, but form a rounded mass; the *mantle-opening* is very extensive, reaching far beyond the eyes; it presents a somewhat W-shaped appearance, owing to the arrangement of its attachments; the free border of the mantle is united to the ventral aspect of the body by a ligament in the middle line, which passes just under the hinder margin of the funnel, whilst this latter has on either side a ligament binding it down to the apex of the gill (Plate **3**, Fig. 11). The *siphon* is very broad at the base and tapers rapidly down to a long tube, which terminates at a considerable distance in front of the eyes. The *funnel organ* is very prominent and indeed can be seen shining through the translucent wall of the siphon. It consists of an elongated white pad in the shape of a W, the central point being attached to the dorsal middle line of the siphon, whilst the extremities of the lateral limbs nearly meet in the ventral median line. On either side of the base of the siphon is a deep hollow, covered by a flap of skin passing backward from the side of the head so as to form a valve. This hollow space is traversed by a band of tissue containing the ganglion stellatum and the nerves connected with it. Behind the eye and just within the angle of the aperture of the mantle-cavity is a minute papilla, which is presumably the *olfactory organ.* The *rectum* terminates at the base of the funnel in the middle line and emerges from the body wall through the ligamentous attachment of the mantle, which is forked to give it passage (Plate **3**, Fig. 11). The anal appendages are spatulate. The *radula* has seven rows of teeth and does not show the arrangement stated by Steenstrup to be characteristic of the genus. According to him each row of the radula differs from those immediately preceding and following it, but in such a way that the pattern repeats itself every five rows. It is quite possible that this character may appear as the animal becomes more mature. The drawing on Plate **4**, Fig. 1, will give a better idea of the form and proportions of the teeth than any verbal description.

Dimensions.

	cm.
Length, total	1.8
End of body to mantle-margin	0.7
End of body to eye	1.0
Breadth of body	1.5
Diameter of largest sucker	0.1

	Right.	Left.
Length of first arm	2.0	2.0
Length of second arm	1.6	1.6
Length of third arm	1.1	1.1
Length of fourth arm	1.1	1.1
Suckers on first arm [1]	18	18
Suckers on second arm [1]	17	19
Suckers on third arm [1]	14	12
Suckers on fourth arm [1]	13	12

On opening the *mantle-cavity,* this is seen to be very short from before backwards, but very extensive laterally. The mantle is only bound down to the body wall in the median line for a short distance anteriorly (Plate **3**, Fig. 11): behind this it is free, so that there is a communication between the two sides. The gills lie one on either side, quite near the posterior margin of the sac; each consists of half a dozen lamellae, crescentic in form, with the concavity directed forwards, and subdivided into numerous tufts. Just at the apex of the gill is attached the ligament which binds down the lateral part of the siphon, and proceeding outwards from this is a broad fold of skin passing backwards from the head and forming a valve, when the mantle contracts over it. This fold of skin is large and loose, and the cavity, which is arched over by it during expiration, must contain a considerable quantity of water, to which must also be added the amount lodged in the lateral extensions of the mantle-cavity, which reach completely round the body, meeting behind the visceral sac. In those cephalopods in which the body is elongated antero-posteriorly there is a large space in the mantle-cavity, behind the gills; this may be fairly assumed to serve the purpose of holding a reserve supply of water which will gradually pass over the gills during expiration. In the present instance, owing to the short, rotund character of the body, space is found for a similar reserve store of water at the outer side of the gills. To the outer side of each gill this cavity is traversed by a ligament which contains the pallial nerve, the ganglion stellatum, and the nerves proceeding from it. The specimen being small as well as unique I was able to make but few observations on its internal anatomy. The heart is fusiform, and lies transversely: the ink-sack is small and pyriform; the renal appendages of the veins large and floccular in appearance, and there is the usual curved caecum at the bottom of the visceral sac. I was not able to ascertain the sex of the specimen.

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[1] These numbers are exclusive of minute evanescent suckers at the tips of the arms.

I have recently had an opportunity of comparing this specimen with one belonging to the same genus in the Hamburg Museum, which closely resembles Steenstrup's type. I find the two specimens agree in the following points:

1. The form and arrangement of the suckers and the umbrella.
2. The mantle-cavity extending all round the visceral sac.
3. The presence of a ligament containing the stellate ganglion.
4. The wide aperture of the mantle-cavity.
5. The long siphon with intermediate ligaments.

The principal differences are that in the present individual the arms are proportionally larger and the umbrella does not extend so near to their ends, and that the siphon is proportionally somewhat longer.

Notwithstanding the difference in the radula, above alluded to, I am inclined to believe the specimen under discussion to be a young example of *Bolitaena microcotyla*.

FAMILY ARGONAUTIDÆ.

Argonautidae Cantraine, '**40**, p. 20.

ARGONAUTA.

Argonauta Linné, '**58**, p. 708.

6. Argonauta hians.

Argonauta hians Solander, '**86**, p. 44.
Argonauta gondola Adams & Reeve, '**48**, p. 3, Plate 2, Figs. 2 i, 2 k, 2 l.

Habitat. — Station 3425, off Las Tres Marias; April 18, 1891; lat. 21° 19′ N., long. 106° 24′ W., 680 fathoms; green mud and sand; temperature, surface 76°, bottom 39°; one specimen, No. 8138. [H. 60.]

This small broken specimen agrees exactly, as far as can be made out, with the figures of Adams and Reeve referred to above, and is of about the same size. The specific name *gondola* has been regarded by Von Martens (**'67**) and other authorities as a synonym of *hians*, and this view I have adopted.

7. Argonauta argo.

Argonauta argo Linné, **'58**, p. 708.

Habitat. — Station 3371, off Cocos Island; March 1, 1891; lat. 5° 26′ 20″ N., long. 86° 55′ W.; temperature, surface 82°; two shells, immature; No. 8172. [H. 57, 58.]

Station 2627 Hyd., off Cape San Francisco; March 25, 1891; lat. 0° 36′ N., long. 82° 45′ W.; temperature, surface 81°; one shell, immature; No. 8139. [H. 59.]

The three specimens all belong to what Dr. von Martens (**'67**, p. 104) calls the *forma aurita*, figured by Férussac and d'Orbigny (**'35**, Argonautes, Plate **2**, Figs. 4, 5).

8. Argonauta, sp.

(Plate 10, Fig. 12.)

Habitat. — 50 miles south of Guaymas, surface; one specimen ♀. [H. 56.]

Station 236, off Arhno, Marshall Islands; January 28, 1900; lat. 6° 34′ N., long. 170° 59′ E., surface, electric light; temperature, surface, 81°; one specimen ♀ [H. 127], one ♂ [H. 145].

These specimens are too young to admit of their being referred to any particular species. The shell of the example from Guaymas (Plate **10**, Fig. 12) is interesting as showing the form at this period of development: it is extremely delicate, and hence has been a little chipped at the edge. The dorsal arms show the usual expansion, greatly shrunken and contracted by the action of the spirit.

FAMILY TREMOCTOPODIDÆ.

Tremoctopodidae Tryon, **'79**, p. 130.
Philonexidae (*pars*) d'Orbigny, **'45**, pp. 159, 199.

TREMOCTOPUS.

Tremoctopus delle Chiaje, **'29**, Plates 70, 71.

9. Tremoctopus quoyanus.

Octopus (*Philonexis*) *quoyanus* d'Orbigny, **'35**, p. 17, Plate 2, Figs. 6–8.
Philonexis quoyanus Férussac and d'Orbigny, **'35**, p. 96, Poulpes, Plate 16, Figs. 6–8, Plate 23, Fig. 5
Tremoctopus quoyanus Hoyle, **'86**, p. 70, Plate 13, Fig. 7.

Habitat. — Tropical Pacific; September 1, 1899; lat. 18° 19′ N., long. 134° 57′ W.; surface, 8 p. m.; temperature, surface 76°; two specimens ♀. [H. 151, 152.]

I refer these specimens to the above species with a little hesitation, because although the general appearance and relative lengths of the arms agree fairly well, there is a very definite pattern of conspicuous chromatophores on the back of the head in both specimens, which does not appear either in d'Orbigny's description or figures. There are two large round chromatophores over each eye (compare Figure *A*), the anterior a little nearer the middle line than the posterior. Almost in the centre of these four is a smaller one, whilst two others nearer the middle line peep out from under the mantle-margin behind. On the arms are first three or four chromatophores in a single series, and then a double series almost up to the extremity.

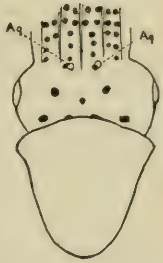

FIG. *A*. *Tremoctopus quoyanus?* Dorsal view. × 2½. *Aq.*, Aquiferous pores.

10. Tremoctopus scalenus,[1] sp. n.

(Plate 4, Figs. 6–9.)

Habitat. — Station 3388, off Cape Mala; March 9, 1891; lat. 7° 6′ N., long. 79° 48′ W.; temperature, surface 73°; one specimen ♀, No. 7963. [H. 51.]

The Body is roughly ovoid in form, but so mutilated posteriorly that it is difficult to make out its original shape correctly. The posterior extremity appears, however, to have been bluntly pointed as shown in the restored outline (Plate 4, Fig. 7).

The Head is small, the sides being occupied entirely by the prominent eyes. The integument is so damaged that the aquiferous pores can no longer be made out.

The Arms are very slender and of unequal length, the second pair enormously exceeding the others. The *Suckers* (Figs. 8, 9) are small, prominent, widely separate and alternating. There is no trace of hectocotylization.

Dimensions.

	mm.
Length, total	120
End of body to mantle-margin	15
End of body to eye	17
Breadth of body	9
Breadth of head	6.5
Diameter of largest sucker	0.75

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[1] In allusion to the marked inequality in the length of the arms.

	Right.	Left.
Length of first arm	40	36
Length of second arm	100	90
Length of third arm	50	24
Length of fourth arm	25	26

This form is sufficiently distinguished by the elongation of the second pair of arms. The disparity in length between the two arms of the third pair is noticeable, — the more so since that of the right side has a truncated extremity, as if it had been originally still longer.

FAMILY POLYPODIDAE, n. n.

Octopodidae Auctorum.

POLYPUS.

Polypus Schneider, ⁏**84**, p. 116.
Octopus Lamarck, ⁏**99**, p. 18.
Polypus Hoyle, :**01**.

I have elsewhere (: **01**) shown that in accordance with the rules of zoölogical nomenclature now generally adopted, Schneider's name must take precedence of that proposed by Lamarck. It is no light matter to change a name that has been in daily use for just over a century, but I am so fully convinced that the only way of securing anything like uniformity in nomenclature is the rigid adherence to rules, that it seems to me best to make the change and trust to its gradual adoption. I notice that this view has been accepted by no less an authority than Mr. Edgar A. Smith, of the British Museum (: **02**).

11. Polypus occidentalis.

Octopus vulgaris var. *americanus* d'Orbigny, '**53**, p. 14, Plate 1, Fig. 1.
Octopus occidentalis Hoyle, '**86**, p. 77.

Habitat. — Charles Island, Galapagos Islands, April 1, 1891 ; one specimen ♀, No. 7943. [II. 39.]

On my last visit to Copenhagen I had the satisfaction of comparing this specimen with Steenstrup's type, in company with my friend the late Dr. H. J. Posselt, whose untimely death in July, 1896, cut short a career of unusual promise.

12. Polypus oculifer, sp. n.

(Plate 4, Figs. 3, 4.)

Habitat. — Charles Island, Galapagos Islands, March 31, 1891 ; one specimen ♀, No. 7948. [II. 40.]

The Body is oblong, rounded behind, very little longer than broad ; with a slight depression in the ventral median line. The *mantle-opening* extends less than halfway round the body, terminating some distance below and behind the eye. The *siphon* is small and bluntly terminated, and would reach only about one-third of the distance from the mantle-margin to the edge of the umbrella.

The Head is short, and, owing to the prominence of the *eyes*, considerably wider than the body.

The Arms are sub-equal in length, the dorsal being somewhat shorter than the others : on the average they are three times as long as the body (measured to the eye). The *umbrella* is well developed between each pair of arms, though between the dorsal arms its radius is only 12 mm., whilst between the ventral it is 18 mm. (measured from the mouth). The *suckers* are of average size, closely set and rather prominent : the three proximal ones form a single series. On the third left arm the eleventh sucker is absent: a similar loss seems to have affected the second right arm, but to be in process of repair, for a small sucker is growing in the space between the ninth and eleventh, which was probably formerly occupied by a much larger one. No hectocotylus is present.

The Surface is rough: the back is covered with granulations which become smaller on the sides and gradually vanish in the centre of the lower surface. These are also found on the external surface of the umbrella and on the proximal moiety of the arms. Very minute granulations occur also on the internal surface of the umbrella and the adjacent portions of the sides of the arms. There are no cirri and no papillae which are much larger than the others.

The Color (in spirit) is a dull violet, shading into ochre below. On the sides lighter patches are indistinctly seen separated from each other by darker veins. In front of and below each eye between the bases of the lateral arms is an eye-like spot, distant about 7 mm. from the eye and 8 to 11 mm. from the umbrella margin (Plate **4**, Fig. 4). It has a pale whitish centre, surrounded by a dark ring; this in its turn is bounded by a broader area of the paler color of the skin, enclosed by a narrow dark line.

Dimensions.

		mm.
Length, total	about	52
End of body to mantle-margin		11
End of body to eye		15
Breadth of body		13
Breadth of head		14
Eye to edge of umbrella		13
Diameter of largest sucker		2.3

	Right.	Left.
Length of first arm	44[1]	35
Length of second arm	50	55
Length of third arm	50	52
Length of fourth arm	40	50

[1] The lengths of the arms are measured from the mouth.

From the five species of *Polypus*, which have hitherto been described as having an ocellar spot in front of the eye, the present form is easily distinguished as follows: —

1. From *P. pulcher* (Brock) ('**87**, p. 607) by the rough surface of the body, combined with the absence of any specially prominent cirri.

2. From *P. areolatus* (De Haan) (Fér. & D'Orb. '**35**, p. 65) by the dorsal (not the fourth arms being the shortest), by the smaller development of the arms, and by the centre of the eye-spot being light instead of dark.

3. From *P. ocellatus* (Appellöf) ('**86**, p. 8) by the relative shortness of the ventral arms, by the absence of a cirrus over the eye, by the ocellus being situated nearer to the eye than to the umbrella margin, and by its having a white centre.

4. From *P. membranaceus* (Quoy & Gaimard) ('**32**, p. 89) by the absence of the lateral web on the body.

5. From *P. bimaculatus* (Verrill, '**83**A, p. 121) by the rough granular surface, with a distinct cirrus over each eye, and by the ocellar spot being of a purplish black all over without any paler centre or ring.

13. Polypus pusillus.

(Plate 4, Fig. 5; Plate 5, Fig. 1.)

Octopus pusillus Gould, '**52**, p. 478, Fig. 591.
Octopus pusillus Tryon, '**79**, p. 112, Plate 31, Figs. 32, 33.
Octopus pusillus Ortmann, '**88**, p. 644, Plate 21, Fig. 1.

Station 3356, off Mariato Point; February 23, 1891; lat. 7° 9′ 30″ N., long. 81° 8′ 30″ W., 546 fathoms; soft blue mud; temperature, surface 83°, bottom 40.°1; one specimen ♀, No. 7952. [H. 98.]

Station 3358, off Cape Mala; February 24, 1891; lat. 6° 30′ N., long. 81° 44′ W., 535 fathoms; green sand; temperature, surface 83°, bottom 40.°2; one specimen ♀, No. 7954. [H. 54.]

Station 3363, east of Cocos Island; February 26, 1891; lat. 5° 43′ N., long. 85° 50′ W., 978 fathoms; white globigerina ooze; temperature, surface 83°, bottom 37.°5; one specimen ♂, No. 7949. [H. 38.]

Station 3417, off Acapulco; April 11, 1891; lat. 16° 32′ N., long. 99° 48′ W., 493 fathoms; green mud; temperature, surface 82°, bottom 40.°6; one specimen ♀, No. 7950. [H. 37.]

Station 3418, off Acapulco; April 11, 1891; lat. 16° 33′ N., long. 99° 52′ 30″ W., 660 fathoms; brown sand, black sp.; temperature, surface 82°, bottom 39°; one specimen ♀, No. 7953. [H. 43.]

It is not without hesitation that I refer all these specimens to the above species. Gould's description leaves something to be desired in the matter of fulness and precision, but the most conspicuous character (the large globular eyes) is shared by them; they also agree in the size of the umbrella and in the smooth surface. The arms are given by Gould as being in order of length, 1, 2, 3, 4; but it would appear from his figure that there is no great disparity between them and that they might with propriety be termed sub-equal. It may further be remarked, in this connection, that in Gould's specimen the arms were contorted by the contraction of the mantle, under which circumstances accurate measurements are very difficult. In all these from the "Albatross" Expedition the arms are sub-equal; in some one is a trifle longer, in others another. In the male specimen (No. 7949), in which the total length is 8.5 cm. and that of the longest arms 6.5 cm., the hectocotylized arm is only 4.5 cm. long and the modified extremity only 4 mm. This is of the usual form; the centre of the spoon-shaped portion forms a rounded elevation without any transverse ribs (Plate **4**, Fig. 5). The specimen numbered 7950 differs from the last (7949) in the paler dull-gray color, but this is possibly due to some difference in the mode of preservation. The body is distended and wrinkled, and much of the epidermis is stripped from the arms. The proximal four suckers are in two rows, not in one, but I am not at all sure of the value of this character.

The radula presents a noteworthy character in the way in which the lateral denticles of the median tooth occupy successively higher positions as we pass backwards in the radula. There is thus produced a serial repetition which is completed in about five teeth (Plate **5**, Fig. 1).

Specimen No. 7954 is small (about 4.5 cm. in total length), but it seems to me also to belong to this species. It is a good deal more contracted and harder in consistency, and more ruddy in hue. The only difference on account of which I should be inclined to separate it is the existence of a very small pale wart above each eye, but it is so small and the skin is a good deal wrinkled round about, so that it appears to me too insignificant a character to outweigh the numerous points of resemblance.

14. Polypus tonganus?

Octopus tonganus Hoyle, '**86**, p. 83, Plate 8, Figs. 1, 2.

Habitat. — Pacific Ocean, between Columbia and Mexico; no more precise locality. Two specimens. No. 8040. [H. 34, 35.]

The larger, a very flaccid and mutilated specimen, presents no characters by which it can be distinguished from the species discovered by the "Challenger" at Tongatabu. The identification is a little uncertain because the "Challenger" specimens were in a state of extreme contraction and the surface considerably injured by mutual pressure.

One specimen is about 20 cm. in total length, the other about 6 cm.

15. Polypus januarii.

(Plate 5, Fig. 2.)

Octopus januarii Hoyle, **'86**, p. 97, Plate 7, Figs. 1–4.

Habitat. — Station 3371, off Cocos Island; March 1, 1891; lat. 5° 26′ 20″ N., long. 86° 55′ W., 770 fathoms; globigerina ooze; temperature, surface 82°, bottom 39°; one specimen ♂, No. 7944. [H. 41.]

The body of this example was in a very rotten and disintegrated condition, and among the débris at the bottom of the bottle I found several spermatophores. A portion of the radula is figured in Plate **5**, Fig. 2.

16. Polypus macropus? juv.

Octopus macropus Risso, **'26**, p. 3.
Octopus Cuvierii Férussac and d'Orbigny, **'35**, Poulpes, Plate 4.
Octopus macropus Jatta, **'96**, p. 217.

Habitat. — Arhno Atoll, Marshall Islands; January 24–26, 1900; lat. about 7° N., long. about 171° 30′ E.; surface of the lagoon, electric light; one young specimen ♀. [H. 111.]

This small specimen, not quite 10 cm. in total length, is most likely the young of the widely distributed *Polypus macropus* (Risso), or possibly of an undescribed species nearly allied to it.

17. Polypus, sp. juv.

(Plate 5, Figs. 3-9.)

Habitat. — Station 3353, off Cape Mala; February 23, 1891; lat. 7° 6′ N., long. 80° 34′ W., 695 fathoms; green mud; temperature, surface 73°, bottom 39°; 22 specimens, immature; No. 7941. [H. 73–94.]

In the present instance a small shoal of young specimens would seem to have been captured in the trawl. They are quite immature, as may be seen from the fact that in some the yolk sac persists in the midst of the arms. I am not aware that specimens as large as these have been found leading a free existence with the yolk sac still unabsorbed. I have seen advanced embryos of *Sepia* and *Loligo* when artificially liberated swim freely and actively about, though I do not know how long they can survive.

The disposition of the suckers on the arms of these specimens is curious and interesting, for they are sometimes in one row, sometimes in two. In the majority of cases the proximal and the distal suckers are in a single row (Fig. 7), whilst a greater or smaller number in the middle of the arm are arranged biserially (Fig. 6). There are, however, several cases in which the whole of the suckers are in a single series, and these occur in specimens where other arms have the arrangement described above. The disposition is often very irregular, especially where the uniserial arrangement is changing to the biserial (Fig. 5). The question might arise whether these examples belong to the genus *Moschites* (*Eledone*), the uniserial being normal and the biserial due to contraction, or whether they are a species of *Polypus* (*Octopus*) in which the uniserial arrangement is gradually becoming biserial. I have no hesitation in adopting the latter view, because the animals are undoubtedly young, as shown by the presence of the yolk sac, and because, as I have elsewhere remarked, ('**86**, p. 76) the suckers in the genus *Polypus* are not, strictly speaking, in two rows, but in one zigzag row. I am not aware whether this point has been established by an examination of embryos, but the present series of young examples seems to indicate that the suckers are first formed in a single series which press each other sideways so as to form two rows as they become more crowded.

It is quite impossible to decide as to the species to which these specimens belong. From the size to which they have attained before losing the yolk sac it is likely that they are the young of some large species, perhaps one hitherto undescribed. I give below a description, to facilitate the clearing up of this point at some future date.

The Body (Figs. 3, 4) is ovoid, distinctly longer than broad, and the ventral groove is well marked. The *mantle-opening* is narrow, extending only about one-fifth round the body, and ending directly below the centre of the eye. The *siphon* is tapering and extends from one-third to halfway to the umbrella margin, according to its state of contraction.

The Head is short and narrow, distinctly narrower than the body, and the eyes are round, black, and prominent.

The Arms are sub-equal and conical, tapering to blunt extremities. They are about equal in length to the head and body together; round in section except for the projection of the suckers. The *umbrella* extends about one-third up the arms. The *suckers* are small and closely set, and the arrangement varies between a biserial and a uniserial disposition as above described.

The Surface of the dorsal half of the body, head and arms, is finely granular, the inferior half smooth.

The Mantle is attached to the middle line ventrally by a broad ligament, 4 mm. wide, close to its free border. The edge of the mantle is turned over and thickened internally just within the free border so as to form a kind of ridge, which fits into a corresponding hollow in the base of the siphon (Fig. 8); this arrangement no doubt serves to insure the complete closure of the mouth of the mantle when water is being ejected through the funnel.

The Radula was extracted from one of the specimens and is figured on Plate **5**, Fig. 9. In the bending of the outermost teeth and the recurving of the parts of the inner laterals it seems to present signs of incomplete development. The *centrals* have a broad median cusp, tapering to an acute point, and on either side are rudiments of a small lateral cusp. The *first* and *second laterals* are triangular and pointed: the *third* laterals very long and slender and bluntly pointed. The irregular bending shown in the drawing is not, I think, a natural condition.

Dimensions of Figured Specimen.

	mm.
Length, total	37
End of body to eye	12
Breadth of body	14
Eye to edge of umbrella, dorsally	10
Mantle-margin umbrella, ventrally	6
Diameter of largest sucker	0.6

	Right.	Left.
Length of first arm[1]	25	25
Length of second arm	23	23
Length of third arm (about)	22	22
Length of fourth arm	20	20

18. Polypus, sp.

Habitat. — Papiete, Tahiti; on the reefs; November 14, 1899; one young specimen. [H. 146.]

A young Octopus, 11 mm. in total length, with a short bursiform body and sub-equal arms, up which the umbrella extends for a distance of about 1 mm. The body and umbrella are liberally besprinkled with minute brown chromatophores; there is a single row of large pale red chromatophores along the outer aspect of each arm and there is a single similar one above each eye.

19. Polypus, sp.

Habitat. — Arhno Atoll, Marshall Islands; January 24–27, 1900; surface lagoon, electric light; three young specimens. [H. 112, 113, 121.]

These specimens are not specifically determinable; their most prominent characteristics are that the arms are sub-equal, the laterals being slightly larger than the dorsal or ventral. Each arm has on its outer surface a double row of chromatophores, which are small and black on the proximal third, then larger and more reddish in tint. There is also a patch of pale reddish chromatophores between the eyes and on the anterior part of the dorsal surface. The total length is 20 mm., and the arms about 10 mm., measured from a point just in front of the eye.

20. Polypus, sp.

Habitat. — Makatea Island, Paumotu Archipelago; October 6, 1899; shore; one young specimen. [H. 125.]

Makemo Island, Paumotu Archipelago; October 19 or 20, 1899; lagoon; one young specimen. [H. 124.]

This small Octopus, measuring about 3 cm. in total length, has no very striking characteristics, and in view of the inadequacy of our knowledge of the forms from these islands it seems useless to attempt to affix a specific name to it. The specimen from Makemo Island is a little larger, but has become dried and shrivelled so that its determination is even more uncertain.

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[1] Measured from a point opposite the centre of the eye.

MOSCHITES.

Moschites Schneider, **:84**, p. 118.
Eledone Leach, **'17**, p. 137.
Moschites Hoyle, **:01**.

21. Moschites rotunda.

Eledone rotunda Hoyle, **'86**, p. 104, Plate 8, Figs. 4–6.

Habitat. — Station 3398, off Cape San Francisco; March 23, 1891; lat. 1° 7′ N., long. 80° 21′ W., 1573 fathoms; green ooze; temperature, surface 84°, bottom 36°; one specimen ♀, No. 7951. [H. 44.]

With some little hesitation I regard this little species as the young of a species discovered by H. M. S. "Challenger" in the Pacific and Southern Oceans. The only points of difference are: (1) there is a shallow depression in the middle line below, (2) the mantle-opening terminates immediately below the eye, (3) the umbrella is proportionally better developed, and (4) the eyes are comparatively larger. Some of these are known to be characteristics of youth, and I do not think that they justify me in creating a new species for what is undoubtedly a young specimen.

22. Moschites verrucosa.

Eledone verrucosa Verrill, **'81a**, p. 105, Plates 5, 6.
Eledone verrucosa Hoyle, **'86**, p. 104.

Habitat. — Station 3393, off Cape Mala; March 10, 1891; lat. 7° 15′ N., long. 79° 36′ W., 1020 fathoms; green mud; temperature, surface 74°, bottom 36.°8; three specimens ♀, two badly macerated, No. 7940. [H. 95–97.]

The only one of these specimens which was in reasonably good condition agrees very well with Verrill's description. The eyes are rather more swollen than in his figure, and the tubercles covering them are uniform in size. Verrill states that in his female they were smaller than in the male, and as the present example is only one-third the size of his, this may probably be due to incomplete development.

ELEDONELLA.

Eledonella Verrill, '**84**, p. 144, Plate 32, Fig. 2.

23. Eledonella diaphana.

(Plate 5, Fig. 11.)

Japetella diaphana Hoyle, '**85** A, p. 232.
Eledonella diaphana Hoyle, '**86**, p. 107, Plate 9, Figs. 3-6.

Habitat. — Station 3366, east of Galapagos Islands; February 27, 1891; lat. 5° 30′ N., long. 86° 45′ W., 1067 fathoms; yellow globigerina ooze; temperature, surface 84°, bottom 37.°0; one specimen ♀, No. 7946. [H. 99.]

Station 3415, S. E. of Acapulco; April 10, 1891; lat. 14° 46′ N., long. 98° 40′ W., 1879 fathoms; brown mud, globigerina ooze; temperature, surface 83°, bottom 36.°0; one specimen ♀, No. 7960 A. [H. 101.]

Station 3420, off Acapulco; April 12, 1891; lat. 16° 46′ N., long. 100° 8′ 20″ W., 664 fathoms; dark green mud; temperature, surface, 82°, bottom 39.°6; one specimen, No. 7947. [H. 100.]

Station 220, about 12 miles southwest of west point of Kwajalong Island, Marshall Archipelago; January 16, 1900; lat. 8° 33′ N., long. 167° 37′ E.; temperature, surface 82°, bottom 35°, 1897 fathoms, globigerina mud; one young specimen. [H. 129.]

These specimens differ only in insignificant characters from the type in the "Challenger" collection. The arms are proportionally a little shorter, but the general appearance, the form and disposition of the chromatophores, and the shape of the suckers are identical. There is no valve in the funnel, and as this character was recorded as doubtful in the case of the "Challenger" specimen I have re-examined this latter with care, and feel now convinced that the appearance of a valve is due to the tip of the funnel organ (the pad alluded to in the "Challenger" Report, p. 107), having become separated from the wall of the funnel.

The specimens were all immature, so that no sex indications were found in the viscera, but I conclude they are females because Verrill's example of *E. pygmaea*, which was no larger than the smallest of them, already showed the enlarged suckers on the third pair of arms which are believed to be characteristic of males.

One of the specimens (No. 7960) shows the funnel organ very well (Plate **5**, Fig. 11). It consists mainly of two pads broader behind than in front, where they are prolonged into a kind of stalk and nearly meet, but are separated by the tip of a much smaller pad lying in the middle line and directed backwards. This median portion springs gradually from the dorsal wall of the funnel without any clear line of demarcation.

The young specimen [H. 129] shows a noticeable resemblance in general appearance to the *Octopus venustus* of Rang (**'37**, p. 66, Plate 93). This authority, however, figures the suckers in two rows, though he adds that they are "assez peu apparentes." The resemblance is in any case sufficiently strong to raise the interesting question whether the small pelagic forms described as *Octopus brevipes* Férussac and d'Orbigny (**'35**, p. 22), *O. capensis* and *O. dubius* Eydoux and Souleyet (**'52**) may not be allied to *Eledonella*.

JAPETELLA.

Japetella Hoyle, **'85 a**, p. 231; **'86**, p. 109.

24. Japetella prismatica.

(Plate 5, Figs. 10, 12.)

Japetella prismatica Hoyle, **'85 a**, p. 231; **'86**, p. 109, Plate 9, Figs. 1, 2.

Habitat. — Station 3414, off Tehuantepec; April 8, 1891; lat. 10° 14′ N. long. 96° 28′ W., 2232 fathoms; green mud; temperature, surface 82°, bottom 35.°8; one specimen ♂, No. 7945 B. [H. 36.]

I have compared this specimen with the type in the British Museum (Natural History) and have satisfied myself that both belong to the same species: there are, however, one or two points which call for special notice.

In the "Challenger" Report it is stated (p. 108) that there is a valve in the siphon, but I have ascertained by comparison of this example with the type that I was misled (as in the case of *Eledonella diaphana*) by the tip of the funnel-organ having become detached, producing a deceptive appearance of a valve. The form of the funnel-organ in the "Challenger" specimen is shown in Plate **5**, Fig. 12.

The other point relates to the median septum in the branchial cavity. In the "Challenger" specimen such a septum appeared to be absent, but in the present example there is a narrow delicate ridge running along the median ventral line of the interior of the mantle, which may be the remains of such a septum, though I can find no trace of its attachment to the visceral sac. Led by this discovery, I have re-examined the "Challenger" type and find there also traces of a similar ridge on the inner surface of the mantle. It seems, therefore, quite within the bounds of possibility that specimens in a better state of preservation might show a complete septum, in which case there would be no further cause for separating the genera *Eledonella* and *Japetella*. Although I think it very probable that in the future these two genera will be united, I think it advisable pending further evidence to retain them as distinct. The suckers on the third pair of arms of the "Albatross" specimen are much enlarged (Plate **5**, Fig. 10), exactly as figured by Verrill (**'84**, Plate **32**, Fig. 2) in the case of *Eledonella pygmaea*. This is almost certainly a form of hectocotylization and is an additional point of similarity between these two genera.

FAMILY SEPIOLIDAE.

EUPRYMNA.

Euprymna Steenstrup, **'87**, p. 66 (20).

25. Euprymna stenodactyla.

Sepiola stenodactyla Grant, **'33**, p. 42.
Sepiola stenodactyla Grant, **'33 A**, p. 77, Plate 11, Figs. 1, 2.
Euprymna sthenodactyla Steenstrup, **'87**, p. 66 (20); **'87 A**, p. 89 (43).
Inioteuthis stenodactyla Brazier, **'92**, p. 9.
Sepiola stenodactyla Joubin, : **02**, p. 92.

Habitat. — South Pacific Ocean, near Rangiroa; September 24, 1899; about lat. 15° S., long. 148° W.; surface tow net, 8 P. M., one specimen. [H. 126.]

Funafuti Island; December 24, 1899; shore, taken with the seine; one specimen. [H. 128.]

Gilbert Islands about one mile off Tarawa Island; January 2, 1900; surface, electric light; one specimen. [H. 137.]

Marshall Islands, Arhno Atoll; January 24–26, 1900; surface of lagoon, electric light; seven specimens. [H. 114–120.]

Same locality; January 27, 1900; two specimens. [H. 122, 123.]

The Body is thick and rounded; the fins are round, nearly circular, and rather more than half the body in length; there is a notch at the anterior but not at the posterior origin from the mantle; a broad ligament unites the *mantle* with the head in the nuchal region; the articulation between the mantle and the *siphon* consists of an elongated ridge and groove as usual in the family; the siphon is conical and reaches just to the gap between the ventral arms.

The Head is very broad and the *eyes* very large and prominent.

The Arms are in order of length 3, 2, 1 = 4; rather thick, rounded, and tapering, with no trace of keel, or protective membrane; the *suckers* are, speaking generally, in four rows, though the arrangement is here and there a little irregular; those at the root and tip are in two rows, and there appear to be one or two sets of three between; they are spheroidal, oblique, and of the type usual in *Sepiola*. In the male the suckers are somewhat differently disposed; in the *first right arm* (Fig. *B*) the two outer rows of suckers are a little larger than the inner,

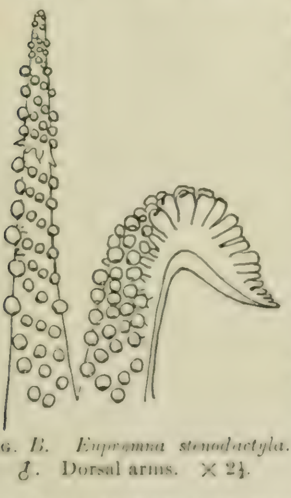

FIG. *B*. *Euprymna stenodactyla*. ♂. Dorsal arms. × 2¼.

and those of the ventral row are again a little larger than those of the dorsal in the middle of the arm; the *first left arm* is a very little shorter than its fellow and decidedly thicker; the suckers are first in two and afterwards in four rows, and extend about halfway up the arm, where they are succeeded by a number of stout papillae in two or three rows (Fig. *C*); these thicken towards the tip, and do not bear suckers, but each has in its rounded top a slit, much resembling a mouth, closed by two lips, one thicker than the other; they diminish rapidly towards the tip of the arm. The modified papillae about halfway up figured by Appellöf ('**86**, Plate **2**, Fig. 16), in *Inioteuthis morsei* were not seen, though there were two stalks from which suckers had fallen in this position. In the *second* arms the suckers of the outer rows are a little larger than those of the inner. In the *third* pair not only are the two outer rows enlarged, but four or five in the ventral row are much larger than the rest (Fig. *D*). In the *fourth* pair the outer rows are again somewhat larger than the inner, and there are two or three suckers of the dorsal series and four or five in the ventral much enlarged, though not to so great an extent as in the third pair. The *web* between the third and fourth arms extends up about one-fourth of their length; it is very small between the other pairs of arms and absent between the ventral pair.

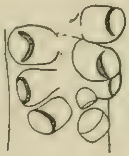

Fig. *C*. *Euprymna stenodactyla*. Modified suckers of left dorsal arm. × 8.

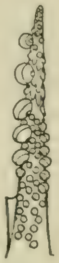

Fig. *D*. *Euprymna stenodactyla*. Third right arm. × 2½.

The Tentacles are about as long as the arms; there is a groove in the inner aspect of their *stem*, the dorsal margin of which is elevated into a kind of web or deep keel towards the *club*, which bends round in a hook; it is slightly expanded and of a velvety appearance, owing to the numerous small suckers.

The Color is yellowish gray, with very conspicuous chromatophores, especially large on the back of the head and the arms. In the latter there is a row of transversely elongated oval chromatophores up the outer surface, as figured by Grant, and a small round one on the pedicle of each sucker of the two outer rows. There is also a row of transversely placed oval ones on the outer side of the tentacular stem.

Dimensions of H. 114.

	mm.
Length, total	33
End of body to mantle-margin	11.5
Breadth of body	12
Breadth of head	12
Breadth of nuchal ligament	8
Centre of eye to edge of umbrella, between second and third arms	8
Length of fin	7
Breadth across both fins	21

	Right.	Left.
Length of first arm	11	10
Length of second arm	16	16
Length of third arm	17	17
Length of fourth arm	11	11
Length of tentacle	13	13

The following discrepancies between the above account and that given by Grant seem worth mentioning. The arms are a little larger than would correspond with the measurements given in Grant's text, but in the figure the arms are shown as larger than stated in the text. The tentacle is much longer in Grant's figure and description than in the "Albatross" specimens, but this organ varies so much in this respect both during life and after death according to preservation that a difference in this respect can hardly invalidate an identification based on so many resemblances. The head is sunk back into the mantle-cavity and hence the waist-like constriction behind the eyes, shown in Grant's figure, does not appear; this again is merely a matter of contraction of the tissues.

The nomenclature of this interesting form demands, perhaps, a few words of explanation. The generic name *Euprymna* was first proposed by Steenstrup in the Latin summary appended to his paper on the "Mediterranean Species of *Sepiola*" (**'87**). Speaking of the short-finned forms ("species brevipinnes") he says that they approach the typical species of the genus *Inioteuthis* Verrill, "dum ab atypicis speciebus ejusdem generis (*In. Morsei*, *sthenodactyla*, *bursa*, cet. propter connexionem *latam* capitis cum pallio et tentaculorum *miram* formationem ad genus novum, *Euprymnam* mihi dictum, referendis) valde recedunt."

In a subsequent paper (**'87 A**, p. 88 [42]) he recurs to the same subject as follows: "The other Japanese Sepiolid, *In. Morsei* Verr., only provisionally referred by Professor Verrill to the genus *Inioteuthis*, only known to him in the shape of a single female example, is the most northeasterly form yet discovered of a series of very plump, thick-set Sepiolas, which seem to occur in all zones of the Indian Ocean and South Sea, and of which the most southwesterly representative yet known to me is the *Sepiola sthenodactyla* from Mauritius, described and depicted more than fifty years ago (1833) by Prof. Robert Grant in the Trans. Zool. Society, Vol. 1. All the individuals of this thick-set group of Sepiolas are characterized by a very broad ligament between the mantle and head, as has been mentioned by Verrill in the case of *In. Morsei*, Verr., and as is recorded for this species or one closely allied to it by W. Hoyle (Challenger Expd. Cephalop., Plate XLV., Fig. 1) and by Appellöf (*Op. cit.*, [**'86**] Plate II.), and as is equally strongly emphasized both in text and figure by Robert Grant in the case of *Sepiola sthenodactyla* (Plate **11**, Fig. 1), they are especially remarkable for the stout, swollen tentacular clubs, which have a velvety appearance on account of the hair-like thinness of the stalks of the suckers, and the (almost or quite) rudimentary condition of the suckers themselves as figured by Hoyle in the case of *In. bursa*, Pfeff., Plate XIV., Figs. 4–8.

They are all also very remarkable for the shape of the ink-sac, which is broader and with larger auricular processes than even in *Sep. Rondeletii* Leach, or *Sep. atlantica* d'Orbigny. On the whole they constitute, in my opinion, a special and well-marked generic type, which on account of the habit of body mentioned above I have called *Euprymna*, and of whose natural character I am the more convinced, inasmuch as I find in all the males of the group the sexual arm modified in the way represented by Mr. Appellöf (*loc. cit.*) in *In. Morsei.*"

Later on it is stated that *Euprymna* is the Latinized feminine of the adjective *εὔπρυμνος,-ον* and has reference to short, stout body (stern, *πρύμνη*).

Dr. Ortmann ('**88**, p. 647) was presumably not acquainted with this paper of Professor Steenstrup when in 1888 he published his memoir on the Japanese Cephalopoda; it had indeed only appeared in the previous year. Dr. Ortmann points out a number of characters in which *Inioteuthis japonica* differs from *I. morsei*, and concludes by pointing out the necessity of creating a new genus for the latter, unless *I. japonica* is united with *Sepiola*, in which case the name *Inioteuthis* might be retained for *I. morsei* and its allies. Against this it may be pointed out that *I. japonica* was expressly made by Verrill the type of his genus, and as the name *Euprymna* had been proposed and defined by Steenstrup, it seems proper to accept it, whatever may be the fate of *Inioteuthis* as against *Sepiola*.

It is worthy of notice that Professor Steenstrup consistently spells the specific name of this species "*sthenodactyla*," not "*stenodactyla*." In a note appended to No. 7 of his "Notæ Teuthologicæ" ('**87** A, p. 74 [120]), he explains this by the statement that "Grant says expressly that he called the species thus on account of the stoutness and strength of the arms, and that, therefore, it must be in consequence of a typographical error that '*stenodactyla*,' meaning thin or small-armed, has crept into the text and plate." If this were all, it would no doubt be desirable to correct the faulty spelling and write the word as Steenstrup suggests, but the matter is not quite so simple. On turning to Grant's memoir ('**33** A, p. 85) we find these words: "The arms are proportionally much thicker and shorter than in *Sep. vulgaris*. . . . From this contracted form of the cephalic arms, by which it differs so much from the European species, I have termed it *Sep. stenodactyla*," and in the earlier note ('**33**), where the first mention of the species occurs, the name is said to be suggested by "the comparative shortness of its members." *στενός* would, of course, be a correct translation for "contracted," but the contraction referred to seems to have been in the matter of length and not breadth, and it is, to say the least of it, doubtful whether *στενός* can be used in that sense. For myself I have little doubt that Grant meant to write *stenodactyla*, when he would have done better to use *sthenodactyla*, but I do not see that anything is gained by making such a "conjectural emendation."

INCERTAE SEDIS.

CIRROBRACHIUM, gen. n.

In the absence of a complete specimen, the only diagnostic character which can be assigned to this new genus is the presence of a row of filaments along the outer or ventral side of each arm, except those of the fourth pair.

26. Cirrobrachium filiferum, sp. n.

Habitat. — Station 17; equatorial Pacific Ocean, north of the Marquesas Islands; September 10, 1899; lat. 0° 50′ N., long. 137° 54′ W.; trawl, 2463 fathoms; temperature, surface, 79°; one fragmentary specimen. [H. 130.]

The specimen upon which this new species, the type of a new genus, is based consists unfortunately only of the head and arms, which have suffered denudation of the integument here and there. The suckers are, however, almost all intact, as also the characteristic filaments which spring from beside them. A description as complete as I have been able to prepare of the specimen is given below.

The Head, so far as can be seen, was flattened on the dorsal side, and slightly excavated for the funnel below. The *eyes* are large and prominent, and occupy the whole of the lateral surface of the head. The *eyelids* have disappeared, but there can be little doubt that they were of the type common to the Oegopsida. A few patches of the integument remain, which are thickly covered with bright pink chromatophores.

The Arms are slender, rounded, and tapering, and bear, besides the suckers, a series of long slender filaments which form the characteristic peculiarity of the genus. The first pair are about 15 mm. in length, measuring from the front edge of the eye. The suckers are in two rows, small and stalked, and do not show any trace of a modification into hooks. Immediately to the proximal side of each sucker is a dull pink chromatophore. Close to the base of each sucker of the ventral row arises one of the filaments above mentioned. Those springing from the proximal suckers are about twice the diameter of the arm in length; they gradually increase to the middle of the arm, where their length is three or four times the thickness of the arm; they then diminish towards the tip, where they finally disappear. The arms of the second pair are about one-fourth longer than the first. The arrangement of the suckers and filaments is the

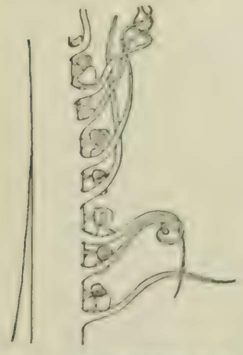

FIG. F. *Cirrobrachium filiferum.* Portion of third right arm. × 5.

same, but the filaments are considerably longer. The arms of the third pair are the largest of all, and were probably twice as long as the first pair; but as they have both been broken off it is impossible to say exactly what was their original length. The filaments in this case are much longer, and in the centre their length is fully four times the diameter of the arm. On the outer aspect of the proximal half of these arms is a distinct keel. The arms of the fourth pair are about as long as the first. They have two rows of suckers, but none of the filaments just described; only a small lappet arising opposite each sucker of the inner series. On the outer aspect of each of these arms is a broad membrane, which stretches outside the root of the tentacle across to the root of the third arm and passes nearly to its tip, becoming gradually narrower as it proceeds. Here and there between the filaments may be seen the remains of a very delicate membrane which seems to have united them, but it is impossible to say how far along the arm this membrane may have extended, or how far it may have reached up the filaments. The only structure with which I am acquainted comparable to this is the series of lappets connected by a membrane, which has been above described in the case of *Abraliopsis* (see pp. 37, 38, *postea*), or the membrane supported by ribs seen in some forms of *Ommastrephes*.

The *suckers* are helmet-shaped, mounted on short tapering peduncles, and with smooth, horny rings.

It is impossible to form any correct idea of the family to which this interesting form should be referred.

Family LOLIGINIDAE.

Loligidae d'Orb., *in*: Férussac and d'Orbigny, **'35**, p. 297.
Loliginei Steenstrup, **'61**, p. 69 (1).
Loliginei Steenstrup, **'81**, p. 28.

LOLIGO.

Loligo Schneider, **'84**, p. 110.
Loligo Lamarck, **'99**, p. 10 (*pars*).

27. Loligo diomedeae, sp. n.

(Plate 5, Fig. 13; Plate 6, Figs. 1-7.)

Habitat. — Station 3422, off Acapulco; April 12, 1891; lat. 16° 47′ 30″ N., long. 99° 59′ 30″ W., 141 fathoms; green mud; temperature, surface, 83°, bottom 53.°5; one specimen ♀, No. 7958. [H. 46.]

The Body is comparatively long, and cylindrical for more than half its length, tapering rather rapidly to the posterior extremity. The *fin* is decidedly short for a *Loligo*, broader than long, slightly notched at its anterior points of attachment to the body and with rounded lateral boundaries. The *mantle-margin* has a blunt nuchal prominence and is slightly excavated ventrally.

The Head presents no character calling for a special remark.

The Arms are unequal, the order of length being 4, 3, 2, 1; the first are slender and have a very distinct dorsal keel; the second have a well-marked ventro-lateral angle; the third are broad and flattened and with a distinct web externally; the fourth are nearly as stout as the second, and have the sides, especially that turned towards the tentacle, excavated into a groove. The *suckers* (Plate 6, Figs. 1, 2) are of the usual form and arrangement; the *horny ring* has about 20 blunt teeth, of which about 12 are in the proximal and 8 in the distal moiety. The *buccal membrane* has seven points, which bear one or two very minute suckers (Plate 6, Fig. 7); between the ventral points is a papilla for the reception of spermatophores.

The Tentacle is small and slender; the club is of the usual type and about one-third the length of the tentacle; in the centre are eight or ten large suckers (Plate 6, Fig. 3), about double the lateral ones in diameter; there are about half-a-dozen proximal suckers and a larger number in four rows distally gradually diminishing in size towards the tip. The *horny ring* in the six or eight largest suckers has five blunt square-cut teeth on its distal margin, and in the lateral and terminal suckers about eight acute teeth separated by intervals broader than themselves on the distal semi-circumference (Plate 6, Fig. 5). The *Gladius* has not been extracted.

Dimensions.

	mm.
Length, total	135
End of body to mantle-margin	85
Breadth of body	18
Breadth of head	15
Eye to edge of umbrella	7
Length of fin	27
Breadth of fin	35
Diameter of largest sucker on sessile arm	1
Diameter of largest sucker on tentacle	1.7

	Right.	Left.
Length of first arm	15	14
Length of second arm	18	19
Length of third arm	25	22
Length of fourth arm	25	24
Length of tentacle	47	47

This species differs from *L. japonica* (Hoyle, '86, p. 157) in the comparatively small length of the fin and in the fact that the teeth in the large tentacular suckers have rather more space between them. It also resembles *L. gahi* in many particulars, but the teeth of the large tentacular suckers are blunt and square instead of with sharp angles of about 60°.

SEPIOTEUTHIS.

Sepioteuthis Blainville, **'24**.

28. Sepioteuthis lunulata.

Sepioteuthis lunulata Quoy & Gaimard, **'32**, p. 74, Plate 3, Figs. 8–13.
Sepioteuthis lunulata Férussac & d'Orbigny, **'35**, p. 300, Sepioteuthes, Plate 3, Fig. 1, Plate 6, Figs. 1–8 [1839].

Habitat. — Jaluit, Marshall Islands; January 13, 1900; shore; six specimens, 3 ♂, 3 ♀. [H. 104–109.]

These specimens present resemblances both to *S. lunulata* and *S. mauritiana*. The former of these presents in the figures given by Quoy & Gaimard a series of dark circular spots on each fin, and in three of the specimens taken by the "Albatross" similar spots, though not so regular either in form or distribution, are found. On the other three they cannot be made out. The six specimens, nevertheless, seem to me all referable to one species, and I can only conclude that this must vary a good deal in the matter of coloration, as indeed is expressly stated by Quoy & Gaimard; for in the case of *S. guineensis*, which is regarded, and no doubt rightly, by d'Orbigny, as being the same species, the spots were not noticed until after it had been preserved.

Turning to other characters, the horny rings of the suckers in the arms and tentacles resemble very clearly the figures given by d'Orbigny of *S. lunulata*, though the teeth are rather fewer than in that species and much less numerous than in *S. mauritiana*. On the other hand as regards the fin, the breadth is 17 per cent of the length in *S. lunulata*, 15 per cent in *S. mauritiana*, and 12.5 per cent in the "Albatross" examples.

To sum up, then, in the suckers the present form resembles *S. lunulata*, in the fin it is more like *S. mauritiana*, whilst in the coloration half the specimens show a very distinct likeness to *S. lunulata*, whilst the others might be *S. mauritiana*. On the whole I have thought it best to refer these examples with some doubt to *S. lunulata*. It is, however, possible that *S. lunulata* and *S. mauritiana* may be only varieties of one widely distributed species.

The tip of the tentacle shows the little spoon-shaped group of suckers to which attention was first called by Goodrich (**'96**, p. 6).

FAMILY OMMASTREPHIDAE.

Ommastrephini Steenstrup, **'61**, p. 1.
Ommastrephidae Gill, **'71**, p. 1.

OMMASTREPHES.

29. Ommastrephes sp.?

Habitat. — Station 14, north of the Marquesas Islands; September 7, 1899; lat. 6° 41′ N., long. 137° W., 150 fathoms to surface; temperature, surface, 82°; three specimens. [H. 133, 141, 142.]

These specimens, though the mantle-length is only some 5 mm., show distinctly the characteristic form of the articulation with the base of the siphon.

SYMPLECTOTEUTHIS.

Symplectoteuthis Pfeffer, **:00**, pp. 178, 180.

This genus has recently been created by Dr. Pfeffer for the reception of the species named below, on account of the fusion of the mantle with the base of the funnel on either side.

30. Symplectoteuthis oualaniensis.

Loligo oualaniensis Lesson, **'29**, p. 240, Plate 1, Fig. 1.
Ommastrephes oualaniensis d'Orb., *in:* Férussac and d'Orbigny, **'35**, p. 351, Calmars, Plates 3, 21; Ommastrephes, Plate 1, Figs. 14, 15.
Ommatostrephes oualaniensis Steenstrup, **'80**, pp. 76, 84.
Ommastrephes oualaniensis Hoyle, **'86**, p. 162.
Symplectoteuthis oualaniensis Pfeffer, **:00**, p. 180.

Habitat. — Station 3363, east of Cocos Island (surface tow-net); February 26, 1891; lat. 5° 43′ N., long. 85° 50′ W., 978 fathoms; white globigerina ooze; temperature, surface 83°, bottom 37.°5; one specimen. [H. 53.]

The funnel groove (see Figure *F*) somewhat resembles that figured by Steenstrup (**'80**, p. 81) for *Todarodes sagittatus* and *Ommastrephes pacificus* (**'80**, p. 79, Figs. 4, 5) except that the area occupied by the cutaneous folds is very much narrower. In this respect it differs from the original drawing by Lesson (**'29**, Plate **1**, Fig. 2) of his *L. oualaniensis*, where the funnel groove is shown as though it were striated all over.

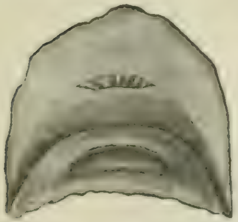

FIG. *F*. Funnel groove of *Symplectoteuthis oualaniensis.*

RHYNCHOTEUTHIS.

31. Rhynchoteuthis chuni, sp. n

Rhynchoteuthis Chun (**:03**).

Habitat. — Station 14; Pacific Ocean, north of the Marquesas Islands; September 7, 1899; lat. 6° 41′ N., long. 137° W.; temperature, surface, 82°; taken at the surface; one young specimen. [H. 134.]

Professor Chun's re-discovery of the curious immature form described by Souleyet (**'52**, p. 17, Plate 1, Figs. 15–21) is of extreme interest, and although the specimen which has come into my hands differs somewhat from those previously figured, it agrees in the *Ommastrephes*-like form of the connection between the mantle and siphon and the fusion of the tentacles. The main difference is that the tentacles are small and short and are united only for a short distance just above the mouth (see Figure *G*), whilst in the others these organs are much elongated, are thicker than the arms, and constitute a stout, flexible proboscis, which has suggested the generic name.

As this form is clearly specifically different from those figured by Professor Chun, I have ventured to name it in his honor.

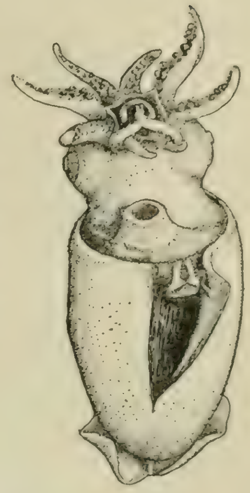

FIG. *G*. *Rhynchoteuthis*, sp. Showing the fused tentacles and the siphonal cartilage; drawn by A. D. Darbishire.

FAMILY BATHYTEUTHIDAE.

Bathyteuthidae Pfeffer, **:00**, pp. 152, 171.

BATHYTEUTHIS.

Bathyteuthis Hoyle, **'85**, p. 272.
Benthoteuthis Verrill, **'85**, p. 401.

32. Bathyteuthis abyssicola.

(Plate 1, Fig. 2.)

Bathyteuthis abyssicola Hoyle, **'85**, p. 272, Fig. 108; **'86**, p. 168.

Habitat. — Station 3358; off Cape Mala; February 24, 1891; lat. 6° 30′ N., long. 81° 44′ W., 555 fathoms; temperature, surface, 83°, bottom 40.°2; green sand; one specimen, No. 7967. [H. 52.]

Station 3388; off Cape Mala; March 9, 1891; lat. 7° 6′ N., long. 79° 48′ W.; 1168 fathoms; temperature, surface, 73°, bottom 36° 2′; green globigerina ooze; one young specimen. [H. 533.]

A colored drawing (Plate **1**, Fig. 2) was made when the animal was fresh, and is interesting as showing that the deep red color common to many deep-sea Cephalopods fades only very slightly under the influence of alcohol, the specimen being now almost as dark in hue as the drawing. The mantle in this specimen was 23 mm. long, but it is not so prominent in the nuchal region as shown in the drawing. The head and arms also are figured a little too large.

FAMILY MASTIGOTEUTHIDAE.

Mastigoteuthidae Verrill, **'81** A, p. 100.

MASTIGOTEUTHIS.

Mastigoteuthis Verrill, **'81** A, p. 100.

33. Mastigoteuthis dentata, sp. n.

(Plate 6, Figs. 8-11.)

Habitat. — Station 3400; E. of Galapagos Islands; March 27, 1891; lat. 0° 36′ S., long. 86° 46′ W., 1322 fathoms; temperature, surface 81°, bottom 36°; light gray globigerina ooze; one specimen ♀, No. 7956. [H. 102.]

Station 3394; off Cape Mala; March 10, 1891; lat. 7° 21′ N., long. 79° 35′ W., 511 fathoms; temperature, surface 73°, bottom 41.°8; dark green mud; one specimen ♂, No. 7957. [H. 45.]

This species differs from *Mastigoteuthis agassizi* (Verrill, **'81** A. p. 100) in the fact that the horny rings in the suckers of the arms are furnished with teeth (Plate **6**, Fig. 8), whereas in that species they are smooth.

It differs from *M. levimana* Lönnberg (**'97**, p. 605) in the fact that the ventral arms are thicker and not thinner than the others and have the suckers normally disposed. It agrees with this, however, in the denticulation of the horny ring of the suckers. Lönnberg is mistaken when he says that the horny rings on the arms of the "Challenger" specimen had pointed teeth. The "Challenger" specimen was only a fragment of a tentacle and therefore gave no information regarding the suckers of the arms.

The two sexes show an interesting difference in the form and proportions of the body and fin, the latter being two-thirds the length of the mantle in the male and only about two-fifths in the female; the body too is more conical in the former, more cylindrical in the latter. The absolute dimensions of the male are much smaller, but there is no evidence to show whether the specimens are full grown. One of Verrill's male specimens attained a length of 232 mm., which is intermediate in size between the two examples here described.

The general arrangement of the organs seen on opening the mantle-cavity is shown in Plate **6**, Figs. 10, 11.

Dimensions.

	7957♂	7956♀
	mm.	mm.
Length, total (without tentacles)	180	290
End of body to mantle-margin	72	140
End of body to eye	81	155
Breadth of body	17	30
Breadth of head	17 ?	25 ?
Length of fin	48	60
Breadth of fin	52	75

	♂		♀	
	Right.	Left.	Right.	Left.
Length of first arm	37	38	53	53
Length of second arm . . .	44	47	57	70
Length of third arm	45	42	70	67
Length of fourth arm . . .	87	78	130	125

Family ONYCHOTEUTHIDAE.

Onychoteuthidae Gray, '**47**, p. 206.

ONYCHOTEUTHIS.

Onychoteuthis Lichtenstein, '**18**, p. 1591.

34. Onychoteuthis banksi.

Loligo banksii Leach, '**17**, p. 141.
Onychoteuthis banksii d'Orb. and Fér., '**35**, p. 332, Onychot., Plates **1–5**, **9**, and **12** [1839].
Onychoteuthis banksi Pfeffer, :**00**, p. 159.

Habitat. — Tropical Pacific Ocean; September 6, 1899; lat. about 8° N., long. about 137° W.; surface at night; one specimen. [H. 110.]

TELEOTEUTHIS.

Onykia Lesueur, '**21**, p. 98.
Teleoteuthis Verrill, '**82**, p. 70.

35. Teleoteuthis caribaea.

Onykia caribaea Lesueur, '**21**, p. 98, Plate **9**, Figs. 1, 2 *a–e*.
Teleoteuthis caribaea Verrill, '**82**, p. 70.
Teleoteuthis caribaea Pfeffer, :**00**, p. 157.

Habitat. — Station 1, 320 miles from Point Conception; August 26, 1899; lat. 31° 10′ N., long. 125° W.; surface; temperature, surface, 63°; three specimens. [H. 148, 149, 150.]

Station 14, north of the Marquesas Islands; September 7, 1899; lat. 6° 41′ N., long. 137° W.; surface; temperature, surface 82°; two specimens. [H. 131, 132.]

Dr. Pfeffer has confirmed the identification of these specimens, which are all very young, the largest measuring only 10 mm. in length of mantle.

36. Onychoteuthid, gen. et sp.?

Habitat. — Station 18, about 75 miles north of the Marquesas Islands; September 13, 1899; lat. 6° 25′ S., long. 138° 59′ W.; 400 fathoms to surface; temperature, surface, 80°; one specimen. [H. 136.]

Station 27, off Anna Maria Bay, Marquesas Islands; September 15, 1899; lat. 9° 01′ S., 140° 04′ W.; 320 fathoms to surface; temperature, surface, 79°; one specimen. [H. 138.]

These two small specimens are probably both to be referred to the same species, though the one first mentioned is much shrivelled. They are almost certainly the young of one or other of the numerous hook-squids.

FAMILY ENOPLOTEUTHIDAE.

Enoploteuthidae Pfeffer, **:00**, pp. 153, 163.

ABRALIOPSIS.

Abraliopsis Joubin, '**96**, pp. 32.

37. Abraliopsis hoylei.

(Plate 1, Fig. 3; Plate 8.)

Enoploteuthis hoylei Pfeffer, '**84**, p. 17.
Abraliopsis hoylei Joubin, '**96**, p. 33.

Habitat. — Station 3375, off Cape San Francisco, March 4, 1891; lat. 2° 34′ N., long. 82° 29′ W., 1201 fathoms; gray globigerina ooze; temperature, surface 77°, bottom 36.°6, one specimen ♂, No. 7959 A. [H. 65.]

Station 3382, off Mariato Point, March 7, 1891; lat. 6° 21′ N., long. 80° 41′ W., 1793 fathoms; green mud; temperature, surface 75°, bottom 35.°8; one specimen ♀, No. 7964. [H. 66.]

Station 3414, off Tehuantepec ("surface to 300 fathoms"), April 8, 1891; lat. 10° 14′ N., long. 96° 28′ W., 2232 fathoms; green mud; temperature, surface 82°, bottom 35.°8, one specimen ♀. [H. 67.]

Station 3415, S. E. of Acapulco, April 10, 1891; lat. 14° 46′ N., long. 98° 40′ W., 1879 fathoms; brown mud, globigerina ooze; temperature, surface 83°, bottom 36°; one specimen ♂, No. 7960 B. [H. 68.]

The female specimen from Station 3414 is very well preserved, and I have no doubt about its being correctly referred to this species, for my friend Dr. Pfeffer and I compared it together with the type specimen in the Hamburg Museum. The only difference of any moment is that the tentacular club is provided with three instead of four large hooks. The dark spots on either side of the cartilage in the nuchal region are perceptible, though faint, a character which in this species differs from *A. pfefferi* Joubin.

A colored figure of this individual from a sketch made on board whilst the animal was alive will be found on Plate **1**, Fig. 3.

The characters of the arms have not been very minutely described either by Joubin or Pfeffer. The order of the arms in the present specimen is 4, 2, 3, 1, on the left side, whereas on the right side 4 is much shorter, and the order is 2, 3, 1, 4. The first (Plate **8**, Fig. 3) arm has a keel for about the distal two-thirds of its length, which attains its greatest breadth just beyond the middle of the arm, being there rather broader than the thickness of the arm. Along the ventral margin of the sucker-bearing face is a series of lappets, one opposite to each hook, whose maximum length is about equal to the diameter of the arm in its middle: these become gradually shorter toward both the distal and proximal ends of the arm. They are united by a delicate web, which extends almost to their extremities. Along the edge of the proximal moiety of each lappet, just where the web joins it, is a row of minute conical papillae (Fig. 7). The hooks are about fifteen in number, and at the end of the arm is a patch of minute suckers arranged in two rows (Fig. 8). The second arm is in all essential respects similar to the first.

The third arm (Plate **8**, Fig. 2) is much stouter than any of the others, and has a very broad keel, expanding into a swimming membrane throughout the whole of its length. The lappets on the ventral margin of the sucker-bearing face are longer, stouter, and blunter than in the first arm and are united by a web in the same way. On the ventral surface of the arm close to the attachment of the keel are several patches of two to five luminous organs, a group of three being found quite close to the tip.

The fourth arm (Plate **8**, Figs. 4, 5) presents considerable differences from the others. It is distinctly longer and the hooks are smaller, and there are no suckers at the extremity. On the dorsal margin of the hook-bearing face is a low irregular elevation, which looks like a vestigial protective membrane: it extends from a point opposite the proximal hook to about two-thirds up the arm. On the ventral margin a narrow membrane extends along the middle third. On the dorso-external aspect of the arm is a membrane which springs from the root of the third arm, passes outside the tentacle, and is attached along the fourth arm almost to its extremity, becoming gradually narrower as it proceeds. The breadth at the base is about equal to the diameter of the arm. At the extremity are the three black, bead-like knobs, characteristic of the genus, the structure of which has been described by Joubin (**'96**).

Two other specimens I take to be males of the same species. The general arrangement of the arms is the same. The specimens are not so well preserved, and the delicate web between the lappets along the margins of the arms has been in a great part destroyed. At the base of each arm just proximally to the suckers is a larger or smaller number of small papillae, which look at first sight almost like the stalks from which suckers have fallen. There is, however, no indication of any solution of continuity in the surface, and in no single instance did I find any of them bearing a sucker. On the first arm there are only three or four of these, very low down close to the buccal membrane ; on the second they are slightly more numerous, on the third there are seven or eight, which form a triangular patch with the apex directed towards the root of the arm ; on the fourth right arm there are about a dozen similarly disposed.

The fourth left arm (Plate **8**, Fig. 5) further shows a remarkable form of hectocotylization. This is produced chiefly by a development of the lappets and web along the ventral margin of the sucker-bearing surface. The web becomes rapidly broader from the proximal end, until at a point about one-third along the arm its breadth is three times the diameter of the arm : hence it becomes gradually narrower, running off into the arm just before the tip. The lappets are correspondingly lengthened and form a series of parallel ribs strengthening the membrane. Along their margins (Plate **8**, Fig. 6) may be seen a series of minute papillae like those described on the other arms. On the dorsal margin of the sucker-bearing face is a row of lappets, also provided with rows of papillae, but I was not able to find any trace of a web uniting them. However, as the web is in all cases very delicate, it is quite possible that it may exist. At the root of the arm is the triangular group of papillae alluded to above.

The Radula, which has not been hitherto described, is figured on Plate **8**, Fig. 9. It consists of the usual seven longitudinal series : the *centrals* are extremely simple, an acute point arising from a plain rounded base ; the points diverge from the middle line, sometimes to the right, sometimes to the left, only about one in six being quite symmetrical. The *first laterals* have a strong pointed tip mounted towards the median aspect of a simple base, the points being directed somewhat inwards ; the *second laterals* are stout, curved, and pointed ; the *third laterals* are much larger, comparatively more slender and blunter than the second, and are bent to about the quadrant of a circle.

38. Abraliopsis, sp. ?

(**Plate 2, Fig. 3.**)

Habitat. — Station 2619 Hyd., Gulf of Panama ; March 11, 1891 ; lat. 7° 31′ N., long. 78° 42′ 30″ W., surface to 300 fathoms ; temperature, surface 68° ; one specimen ; immature. [H. 64.]

Station, 14, north of the Marquesas Islands ; September 7, 1899 ; lat. 6° 41′ N., long. 137° W. ; 150 fathoms to surface ; temperature, surface, 82° ; one specimen. [H. 143.]

My friend Dr. Pfeffer, who examined the former of the above-mentioned young specimens, considers it to belong to the *Abraliopsis* group, partly because of the length of the tentacles, and partly because at the extremity of the left ventral arm (the right being imperfect) is to be seen a slight knob-like swelling, which might be a stage in the development of the curious pigmented organ, found in this position in the genus *Abraliopsis*. At this stage of growth there is no trace of hooks: they are represented only by suckers. The colored drawing here reproduced was made on the voyage immediately after the capture of the specimen.

The specimen [H. 143] captured on the later cruise shows rudimentary phosphorescent organs, when examined under a lens just as the alcohol has evaporated from the surface. One ventral arm has a little brown patch near the tip.

PTERYGIOTEUTHIS.

Pterygioteuthis H. Fischer, **'96**, p. 205.
Pterygioteuthis Pfeffer, **:00**, pp. 165, 166.

39. Pterygioteuthis giardi.

(Plates 7 and 9.)

Pterygioteuthis giardi H. Fischer, **'96**, p. 205, Plate 9.

Habitat. — Station 3375, off Cape San Francisco, March 4, 1891; lat. 2° 34′ N., long. 82° 29′ W., 1201 fathoms; gray globigerina ooze; temperature, surface 77°, bottom 36.°6, one specimen, No. 7959 B. [H. 69.]

Station 3406, Galapagos Is., between James and Indefatigable Is., April 3, 1891; lat. 0° 16′ S., long. 90° 21′ 30″ W., 551 fathoms; rock; temperature, surface 81°, bottom 41.°3, one specimen, No. 7965. [H. 70.]

Station 3436, south of Guaymas, April 22, 1891; lat. 27° 34′ N., long. 110° 53′ 40″ W., 905 fathoms; br. m. bk. sp.; temperature, surface 72°, bottom 37.°2, one specimen, No. 7968. [H. 71.]

Station 3437, about 50 miles south of Guaymas, April 23, 1891; lat. — N., long. — W., 628 fathoms; br. m. bk. sp.; temperature, surface 70°, bottom 40°, one specimen, No. 7966. [H. 72.]

As the type specimen figured by Fischer was a very young one, it seems worth while to give a full description of a more mature form.

The Body (Plate **7**, Fig. 6) is conical; about three times as long as broad. The *fins* are each broadly elliptical, attached to the body for only about one-half their length: the breadth across the two expanded fins is about two-thirds the length of the body. The *siphon* is short and bluntly conical with double supporting bands; the *valve* is small, but distinct; the *funnel-organ* consists of a roughly triangular pad, with the sides somewhat excavated; lying on the dorsal wall of the funnel on either side of it are two oval pads, with the anterior extremities directed obliquely inwards.

The Head is large and rounded, distinctly wider than the body: the *eyes* are globular, occupying the whole of each side of the head: the *ocular aperture* is contracted and shows no sign of an emargination. There is only a shallow *depression* for the siphon. Below and behind each eye is the *olfactory organ* in the shape of a minute papilla. Around the inferior circumference of the eye, beneath the integument, are four or five eye-like bodies, which are presumably *phosphorescent organs:* the largest of these is situated just in front of and below the ocular opening; it forms the antero-lateral prominence in the outline of the head and is readily seen through the semi-transparent skin: it is oval in form, the length being nearly equal to the diameter of the lens; the others are difficult to see until the skin has been removed. Surrounding the mouth is an extensive *buccal membrane*, of a purplish color, which is attached to the inner surface of all the arms, except the ventral pair, to a height of about 3 mm. from their bases.

The Arms are sub-equal and about two-fifths the length of the body. The *first* arm (Plate **7**, Fig. 1) is provided on the inner aspect proximally with about eight pairs of moderately large suckers, then four pairs of gradually diminishing hooks, and beyond these a double series of small suckers, gradually diminishing and reaching to the tip of the arm. The form of the hooks is shown in Figs. 8 and 9. On the dorsal margin the middle third of the arm is occupied by a narrow membrane: on the ventral margin is a web nearly half the breadth of the arm, which is cut by a series of notches into lappets large in the middle third of the arm and gradually diminishing towards the apex. On the external aspect of the arm is a narrow web for about its third quarter.

The *second* arm (Fig. 2) is of almost the same length as the first: it is armed with about five pairs of suckers and then three pairs of hooks, beyond which is a single small sucker; there is no web on the dorsal margin, but on the ventral is a broad web which has a wavy margin in the proximal half, becoming somewhat more deeply notched towards the apex: on the external aspect is a narrow web for about the distal third.

The *third* arm (Fig. 3) is of the same length as the second: it is provided with three pairs of suckers and then six or seven hooks about the middle of its length, the distal portion being unarmed: on the dorsal margin is a very narrow web for the proximal two-thirds and on the ventral a broad web, wavy at first and then scalloped: there is a broad web for more than the distal half on the outer aspect.

The *fourth* arm (Fig. 4) tapers more abruptly, especially in the proximal portion, than the others; the dorsal aspect is hollowed, where it lies against the tentacle, and the dorso-external angle is produced into a thin web which joins the root of the third arm: it passes outside the tentacle and expands distally into a web, comparatively broad in the middle third of the arm and becoming evanescent towards the tip. It possesses neither hooks nor suckers.

The *tentacle* is about as long as the body. It is at first slender; then follows a swollen portion, after which it is slender again, and afterwards becomes rhomboidal in section, that angle of the rhomb which is directed outwards being rounded off, whilst the other three are pronounced. From this point it tapers gradually to the tip, there being no expanded club. The sucker-bearing face occupies only a few millimetres of the extreme tip of the infero-internal face. There are two moderate-sized suckers proximally with smooth rings succeeded by two pairs of smaller suckers, and then by a large number of gradually diminishing suckers in four series. Besides the two large proximal suckers are two rounded pads, situated in hollows, so placed that they occupy two angles of a rhombus, the suckers occupying the other two. With the suckers they undoubtedly constitute a fixing apparatus, as suggested by Fischer.

The *Surface* is smooth throughout.

The *Color*, in the spirit specimen, is a pinkish yellow, rather darker above; the buccal membrane a dull yellowish purple, paler within than without.

The *Radula* (Plate **7**, Fig. 7) is remarkable for the complexity of the *central* tooth, which consists of a triangular cusp, springing from a rather irregular base; on either side of the base, near its posterior end, there is a prominence, which sometimes forms a separate denticle, united by a distinct articulation with the body of the tooth; this is seen on the left-hand side of the portion drawn. The *first laterals* are stout and simple, an acute point springing gradually from a somewhat rectangular base. The *second* and *third laterals* are very much alike, sickle-shaped, bent almost to a quadrant, and rather blunter than the others: the outer series are comparatively more slender than the inner.

Dimensions.

	mm.
Length, total (excluding tentacle)	33
End of body to mantle-margin	19
Breadth of body	6
Length of fin	9
Breadth of fin	13
Length of first arm	8
Length of second arm	7
Length of third arm	7
Length of fourth arm	9
Length of tentacle	18

On opening the mantle-cavity there are seen just behind the base of the funnel two acorn-shaped bodies, one on either side of the middle line, the rectum passing forwards between them. Farther back in the middle line is a spheroidal body, very much like an eye in general appearance; still farther back in the middle line is a fourth, and at the root of each gill is another larger one; these are phosphorescent organs, and an account of their structure will be found in the Appendix (p. 51).

Professor Pfeffer has included in the genus *Pterygioteuthis* Rüppell's species hitherto known as *Enoploteuthis margaritifera*. This view I adopted in a communication (:**02**) dealing with the luminous organs of the latter species, but further consideration has led me to the conclusion that the differences between them are too great to allow of such a course. They agree in form and general appearance, in the size and deep color of the buccal membrane, in the tips of the arms being devoid of either hooks or suckers, and very strikingly in the position and structure of the luminous organs. On the other hand *Pterygoteuthis giardi* differs from *Pt. margaritifera* in the following characters:

1. The ventral arm has neither hooks nor suckers.

2. The tentacular club has two fixing cushions and corresponding suckers and no hooks whatever.

3. The subocular luminous organs are not so numerous, and the anterior abdominal organ is single and not a group of three.

These differences, especially those relating to the armature of the tentacular club, seem to me of generic value, and I see no alternative but the creation of a new genus with *Enoploteuthis margaritifera* as its type. For it I propose the name *Pyroteuthis* in allusion to its luminous organs. It is sufficiently diagnosed by the presence of intra-pallial luminous organs combined with a tentacular club armed with both hooks and suckers.

FAMILY HISTIOTEUTHIDAE.

Histioteuthidae Verrill, **'81**, p. 431.
Histioteuthidae Pfeffer, **:00**, p. 168.

CALLITEUTHIS.

Calliteuthis Verrill, **'80**, p. 393.

40. Calliteuthis reversa.

Calliteuthis reversa Verrill, **'80**, p. 393.

Habitat. — Station 3385; off Cape Mala; March 8, 1891; lat. 7° 32′ 36″ N., long. 79° 16′ W., 286 fathoms; temperature, surface 72°, bottom 45.°9, green mud; one specimen, No. 7962. [H. 48.]

This specimen about 35 mm. long appears to be the young of the above species. It is not in very good condition, and the surface has suffered abrasion here and there. This makes it impossible to give the exact distribution of the luminous organs. There appear to be, however, on the first arm a single row on the outer margin, on the third arm a single row along the ventral margin, and on the fourth arm three rows proximally and two rows distally. Pfeffer (**:00**, pp. 169, 170) makes use of the distribution of these organs as a generic character, and it therefore becomes of importance to ascertain whether it varies with age, and if so to what extent.

The division into two parts of the cartilaginous ridge fitting into the base of the siphon, which was mentioned in the "Challenger" specimen, does not appear in this young example.

FAMILY CRANCHIIDAE.

Cranchiadae Gray, **'49**, pp. 36, 37.
Cranchiaeformes Steenstrup, **'61**, p. 69 (1).

CRANCHIA.

Cranchia Leach, **'17**, p. 137.

41. Cranchia scabra.

(Plate 10, Fig. 11.)

Cranchia scabra Leach, **'17**, p. 140.
Octopus (*Philonexis*) *eylais* d'Orbigny, **'35**, p. 20, Plate 1, Figs. 8–14.
Cranchia scabra Owen, **'38**, p. 105, Plate 21, Figs. 1–5.
Philonexis eylais d'Orb., *in:* Férussac & d'Orbigny, **'35**, p. 102, Poulpes, Plate 17, Figs. 4, 5.
Cranchia scabra Steenstrup, **'61**, p. 72 (4).

Habitat. — "Station 74. Surface." [H. 103.]

Station 6; North Pacific Ocean, 960 miles from Guadalupe Island; August 31, 1899; lat. 20° 26′ N., long. 133° 28′ W.; 150 fathoms to surface; temperature, surface 75°; one specimen. [H. 144.]

The specimens here recorded cannot, I think, be referred to any other species than *C. scabra;* the correspondence in the form of the body and fins and the tubercles on the mantle is so close. At the same time there are certain differences in the form of the arms and arrangement of the suckers, which I think it desirable to place on record, and I have therefore given a figure of the oral aspect of the head with the arms of the example from Station 74 (Plate **10**, Fig. 11).

It will be seen that the "Albatross" specimen differs from Owen's description and figures in the following points: —

1. There is no connecting membrane ("intervening web" of Owen) between the arms.

2. There are no processes connecting the oral lip with the arms.

3. The suckers are in a double series with an intervening space between them.

4. There is a double row of suckers on the stem of the tentacle not mentioned by Owen.

It must, however, be observed that the "Albatross" specimen measures only 11 mm. (just over 5 lines) from the posterior end of the body to the root of the tentacle, whilst in Owen's the corresponding dimension was fully twice as much (11 lines). Most of the characters above mentioned are such as may be fairly ascribed to incomplete development. Certainly this is the case with the first three, and with regard to the fourth there is nothing impossible (or even improbable) in suckers being developed which subsequently disappear. This appears to be the case even with the arms in *Verania.* For these reasons I do not think it needful to create a new species for the reception of the present example.

TAONIUS.

Taonius Steenstrup, **'61**, p. 83 (15).

42. Taonius, sp.

(Plate 1, Figs. 4, 5; Plate 6, Figs. 12, 13.)

Habitat. — Station 3414; off Tehuantepec; "surface to 100 fathoms." April 8, 1891; lat. 10° 14′ N., long. 96° 28′ W., 2232 fathoms; temperature, surface 82°, bottom 35°.8; green mud; one specimen; immature. [H. 49.]

This young specimen probably measured about 25 mm. in length (excluding the tentacle) in its uncontracted condition. It is somewhat difficult to form an opinion as to the species to which it should be referred. The shape of the fin and of the terminal portion of the pen is shown in Plate **6**, Fig. 13, but it is too immature to give any definite indications.

The stalk of the tentacle (Plate **6**, Fig. 12) has a flattened surface extending halfway from the club towards the oral extremity, with four rows of very minute long-stalked suckers. In the adult *T. hyperboreus* (Hoyle, **'86**, Plate 33, Figs. 6, 7) there are suckers and fixing pads somewhat similarly disposed. A comparison suggests the query — Are the fixing pads the stumps of suckers which have fallen off? In *T. suhmi* there are two rows of small papillae reaching down the stem of the tentacle for a distance about equal to the length of the club, but there does not seem to be any definite arrangement of suckers and fixing pads. The whole question of the development of these organs would repay investigation if adequate material were forthcoming.

A drawing showing the appearance of the animal when alive is reproduced on Plate **1**, Figs. 4, 5.

43. Decapod, fam., gen., et sp.?

Habitat. — Station 14; north of the Marquesas Islands; September 7, 1899; lat. 6° 41′ N., long. 137° W.; 150 fathoms to surface; temperature, surface 82°; one young specimen. [H. 140.]

A curious little creature with very short mantle, the dorsal margin forming a prominent point in the middle line; the tentacles comparatively very thick. I do not know to what group it is to be referred.

LIST OF STATIONS, WITH THE SPECIES OBTAINED AT EACH.

Cruise of 1891.

Station 3353, off Cape Mala; February 23, 1891; lat. 7° 6′ 15″ N., long. 80° 34′ W., 695 fathoms; temperature, surface 73°, bottom 39°; green mud.

Polypus, sp., No. 7941.

Station 3356, off Mariato Point; February 23, 1891; lat. 7° 9′ 30″ N., long. 81° 8′ 30″ W., 546 fathoms; temperature, surface 83°, bottom 40.°1; soft blue mud.

Polypus pusillus, No. 7952.

Station 3358, off Cape Mala; February 24, 1891; lat. 6° 30′ N., long. 81° 44′ W., 555 fathoms; temperature, surface 83°, bottom 40.°2; green sand.

Cirroteuthis, sp.
Froekenia clara, No. 7961.
Polypus pusillus, No. 7954.
Bathyteuthis abyssicola, No. 7967.

Station 3363, E. of Cocos Island; February 26, 1891; lat. 5° 43′ N., long. 85° 50′ W., 978 fathoms; temperature, surface 83°, bottom 37.°5; white globigerina ooze.

Polypus pusillus, No. 7949.
Symplectoteuthis oualaniensis. [H. 53.]

Station 3366, E. of Galapagos Islands; February 27, 1891; lat. 5° 30′ N., long. 86° 45′ W., 1067 fathoms; temperature, surface 84°, bottom 37°; yellow globigerina ooze.

Eledonella diaphana, No. 7946.

Station 3371, off Cocos Island; March 1, 1891; lat. 5° 26′ 20″ N., long. 86° 55′ W., 770 fathoms; temperature, surface 82°, bottom 39°; globigerina ooze.

Argonauta argo, No. 8172.
Polypus januarii, No. 7944.

Station 3374, S. W. of Malpelo Island; March 3, 1891; lat. 2° 35′ N., long. 83° 53′ W., 1823 fathoms; temperature, surface 80°, bottom 36.°4; green ooze.

Stauroteuthis hippocrepium, No. 7942.

Station 3375, off Cape San Francisco; March 4, 1891; lat. 2° 34′ N., long. 82° 29′ W., 1201 fathoms; temperature, surface 77°, bottom 36.°6; gray globigerina ooze.

Abraliopsis hoylei, No. 7959 A.
Pterygioteuthis giardi, No. 7959 B.

Station 3382, off Mariato Point; March 7, 1891; lat. 6° 21′ N., long. 80° 41′ W., 1793 fathoms; temperature, surface 75°, bottom 35.°8; green mud.

Abraliopsis hoylei, No. 7964.

Station 3385, off Cape Mala; March 8, 1891; lat. 7° 32′ 36″ N., long. 79° 16′ W., 286 fathoms; temperature, surface 72°, bottom 45.°9; green mud.

Calliteuthis reversa, No. 7962.

Station 3388, off Cape Mala; March 9, 1891; lat. 7° 6′ N., long. 79° 48′ W., 1168 fathoms; temperature, surface 73°, bottom 36.°2; green globigerina ooze.

Tremoctopus scalenus, No. 7963.
Bathyteuthis abyssicola. [H. 533.]

Station 3393, off Cape Mala; March 10, 1891; lat. 7° 15′ N., long. 79° 36′ W., 1020 fathoms; temperature, surface 74°, bottom 36.°8; green mud.

Moschites verrucosa, No. 7940.

Station 3394, off Cape Mala; March 10, 1891; lat. 7° 21′ N., long. 79° 35′ W., 511 fathoms; temperature, surface 73°, bottom 41.°8; dark green mud.

Mastigoteuthis dentata, No. 7957.

Station 2619, Hyd., Gulf of Panama, "surface to 300 fathoms;" March 11, 1891; lat. 7° 31′ N., long. 78° 42′ 30″ W., 1100 fathoms; temperature, surface 68°, bottom 36.°5; green globigerina ooze.

Abraliopsis, sp. [H. 64.]

Station 3398, off Cape San Francisco; March 23, 1891; lat. 1° 7′ N., long. 80° 21′ W., 1573 fathoms; temperature, surface 84°, bottom 36°; green ooze.

Moschites rotunda, No. 7951.

Station 2627, Hyd., off Cape San Francisco; March 25, 1891; lat. 0° 36′ N., long. 82° 45′ W., 1832 fathoms; temperature, surface 81°, bottom 36°; gray globigerina ooze.

Argonauta argo, No. 8139.

Station 3400, E. of Galapagos Islands; March 27, 1891; lat. 0° 36′ S., long. 86° 46′ W., 1322 fathoms; temperature, surface 81°, bottom 36°; light gray globigerina ooze.

Mastigoteuthis dentata, No. 7956.

Charles Island, Galapagos Islands; March 31, April 1, 1891.

Polypus oculifer, No. 7948.
Polypus occidentalis, No. 7943.

Station 3406, between James and Indefatigable Islands, Galapagos Islands; April 3, 1891; lat. 0° 16′ S., long. 90° 21′ 30″ W., 551 fathoms; temperature, surface 81°, bottom 41.°3; rock.

Pterygioteuthis giardi, No. 7965.

Station 3410, off Bindloe Island, 4 miles W.; April 3, 1891; lat. 0° 19′ N., long. 90° 34′ W., 331 fathoms; temperature, surface 82°, bottom 44.°2; black sand.

Bolitaena microcotyla, No. 7955.

Station 3414, off Tehuantepec; April 8, 1891; lat. 10° 14′ N., long. 96° 28′ W., 2232 fathoms; temperature, surface 82°, bottom 35.°8; green mud.

Cirroteuthis, sp., No. 7945 A.
Abraliopsis hoylei. [H. 67.]
Taonius, sp. [H. 49.]
Japetella prismatica, No. 7945 B.

Station 3415, S. E. of Acapulco; April 10, 1891; lat. 14° 46′ N., long. 98° 40′ W., 1819 fathoms; temperature, surface 83°, bottom 36°; brown mud, globigerina ooze.

Eledonella diaphana, No. 7960 A.
Abraliopsis hoylei, No. 7960 B.

Station 3417, off Acapulco; April 11, 1891; lat. 16° 32′ N., long. 99° 48′ W., 493 fathoms; temperature, surface 82°, bottom 40.°6; green mud.

Polypus pusillus, No. 7950.

Station 3418, off Acapulco; April 11, 1891; lat. 16° 33′ N., long. 99° 52′ 30″ W., 660 fathoms; temperature, surface 82°, bottom 39°; brown sand, black sp.

Polypus pusillus, No. 7953.

Station 3420, off Acapulco; April 12, 1891; lat. 16° 46′ N., long. 100° 8′ 20″ W., 661 fathoms; temperature, surface 82°, bottom 39°.6; dark green mud.

Eledonella diaphana, No. 7947.

Station 3422, off Acapulco; April 12, 1891; lat. 16° 47′ 30″ N., long. 99° 59′ 30″ W., 141 fathoms; temperature, surface 83°, bottom 53.°5; green mud.

Loligo diomedeae, No. 7958.

Station 3425, off Las Tres Marias; April 18, 1891; lat. 21° 19′ N., long. 106° 24′ W., 680 fathoms; temperature, surface 76°, bottom 39°; green mud and sand.

Argonauta hians, No. 8138.

Station 3436, S. of Guaymas; April 22, 1891; lat. 7° 34′ N., long. 110° 53′ 40″ W., 905 fathoms; temperature, surface 72°, bottom 37.°2; brown mud, black sp.

Pterygioteuthis giardi, No. 7968.

Station 3437, about 50 miles S. of Guaymas; April 23, 1891; 628 fathoms; temperature, surface 70°, bottom 40°; brown mud, black sp.

Pterygioteuthis giardi, No. 7966.

"50 miles south of Guaymas."

Argonauta, sp. [H. 56.]

"Pacific Ocean between Columbia and Mexico."

Polypus tonganus, No. 8040.

"Station 74, surface."

Cranchia scabra. [H. 103.]

CRUISE OF 1899–1900.

Station 1. North Pacific Ocean, 320 miles from Point Conception; August 26, 1899; lat. 31° 10′ N., long. 125° W.; temperature, surface 63°; taken at the surface.

Teleoteuthis caribaea, 3 juv. [H. 148–150.]

Station 6, August 31, 1899; lat. 20° 26′ N., long. 133° 28′ W.; temperature, surface 75°; 150 fathoms to surface.

Cranchia scabra, 1. [H. 144.]

Tropical Pacific; September 1, 1899; lat. 18° 19′ N., long. 134° 57′ W.; temperature, surface 76°; taken at the surface, 8 p. m.

Tremoctopus quoyanus, 2 ♀. [H. 151, 152.]

Equatorial Pacific Ocean, north of the Marquesas Islands; September 6, 1899; lat. about 8° N.; long. about 137° W.; surface at night.

Onychoteuthis banksi, 1. [H. 110.]

Station 14, Pacific Ocean, north of the Marquesas Islands; September 7, 1899; lat. 6° 41′ N., long. 137° W.; temperature, surface 82°; taken at the surface.

Teleoteuthis caribaea, 2 juv. [H. 131, 132.]
Ommastrephes, sp., 1 juv. [H. 133.]
Rhynchoteuthis chuni, 1 juv. [H. 134.]
Embryo, indeterminate. [H. 147.]

Station 14; 150 fathoms to surface.

Ommastrephes, sp., 2 juv. [H. 141, 142.]
Abraliopsis, sp., 1 juv. [H. 143.]
Embryo, indeterminate, 2. [H. 139, 140.]

September 7, 1899; surface, 8 p. m.

Embryo, sp. indet. [H. 135.]

Station 17, equatorial Pacific Ocean, north of the Marquesas Islands: September 10, 1899; lat. 0° 50′ N., long. 137° 54′ W.; depth, 2463 fathoms; temperature, surface 79°; light yellowish-gray globigerina ooze; trawl.

Cirrobrachium filiferum. [H. 130.]

Station 18, 175 miles north of the Marquesas Islands; September 13, 1899; lat. 6° 25′ S., long. 138° 59′ W.; temperature, surface 80°; 400 fathoms to surface.

Onychoteuthid, gen. et sp. indet. [H. 136.]

Off Rangiroa Island; September 24, 1899; lat. about 150° N., long. 148° W.; 8 p. m., surface tow net.

Euprymna stenodactyla, 1 juv. [H. 126.]

Station 27, 6 miles S. 20° E. of Anna Maria Bay; September 15, 1899; lat. 9° 1′ S., 140° 4′ W.; temperature, surface 79°; 320 fathoms to surface.

Onychoteuthid, indet., 1 juv. [H. 138.]

Makatea Island, Paumotu Archipelago; October 6, 1899; shore.

Polypus, sp. juv. [H. 125.]

Makemo Island, Paumotu Archipelago, October 20, 1899. Lagoon of Makemo, October 19, 1899.[1]

Polypus, sp. [H. 124.]

Papiete, Tahiti; on the reefs, November 14, 1899.

Polypus, sp. [H. 146.]

Funafuti Island; December 24, 1899; shore; taken by the seine.

Euprymna stenodactyla, 1 ♀. [H. 128.]

Gilbert Islands, about 1 mile off Tarawa Island; January 2, 1900; surface, electric light.

Euprymna stenodactyla, 1 juv. [H. 137.]

Jaluit; January 13, 1900; shore.

Sepioteuthis lunulata, ♂ ♀. [H. 104–109.]

Station 220, southwest of Kwajalong Island, Marshall Islands; January 16, 1900; lat. 8° 38′ N.; long. 167° 37′ E.; temperature, surface 82°; 150 fathoms to surface.

Eledonella diaphana, juv. [H. 129.]

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[1] There were two labels with different dates in this bottle.

Arhno Atoll, Marshall Islands; January 24–26, 1900; lat. about 7° N.; long. about 171° 30′ E.; surface of the lagoon, electric light.

Polypus macropus, juv. [H. 111.]
Polypus, sp. juv. [H. 112, 113.]
Euprymna stenodactyla, 2 ♂ [H. 114, 116], 1 ♀ [H. 115]; 4 juv. [H. 117–120.]

Arhno Atoll, January 27, 1900; surface of the lagoon, electric light.

Polypus, sp. juv. [H. 121.]
Euprymna stenodactyla, 1 ♀ [H. 122], 1 juv. [H. 123.]

Station 236; southwest of Arhno Atoll, Marshall Islands; January 28, 1900; lat. 6° 34′ N., 170° 59′ E.; temperature, surface 81°; surface, electric light.

Argonauta, sp. 1 ♀ [H. 127], 1 ♂ [H. 145].

APPENDIX.

THE LUMINOUS ORGANS OF CERTAIN CEPHALOPODA.

(A) Pterygioteuthis giardi.

(Plate 9.)

The luminous organs in this species closely resemble, as might be expected, those of the nearly allied species, *Pyroteuthis margaritifera*. Of these a short notice has recently appeared (Hoyle, :02), and what follows will, of necessity, be to some extent a recapitulation of that paper. The specimens which came into my hands had not been preserved with any special view to histological examination, and some of them had suffered a good deal of injury, so that the account here given can only be regarded as of a preliminary character.

The most striking peculiarity in regard to the luminous organs in the genus *Pterygioteuthis* is that they are situated on the eyeball or within the mantle-cavity, in either case below the integument, so that they are only functional by reason of its transparence during life. After immersion in alcohol the tissues become opaque, and though sometimes one or two of the larger ocular organs may be dimly seen through the skin, it is only after dissection that they are clearly visible, or, in the case of the intrapallial organs, visible at all.

As in the Mediterranean species, the luminous organs may be divided, according to their situation, into four sets: —

I. Ocular.
II. Siphonal (Plate 9, Fig. 1, *S.*, *S.*)
III. Branchial (Fig. 1, *B.*, *B.*)
IV. Abdominal (Fig. 1, A^1, A^2).

I. The Ocular Organs are disposed in the equatorial region of the ventral aspect of the eyeball, and resemble a series of warts projecting from it. Owing to the damaged condition of the eyes in most of the "Albatross" specimens, I have been unable to determine their number and position with certainty, but there appear to be five, situated at approximately regular intervals on the lower half of the equator of the eyeball. Each organ is roughly spheroidal, with the outer surface somewhat flattened and the deeper more convex. The diameter and the depth are subequal, being about 0.45 mm. in the larger and a little more than half as much in the smaller.

As regards microscopic structure, the state of preservation leaves so much to be desired that it seems hardly worth while to go into very minute details. The following is an account of the facts I have been able to elucidate by a study of serial sections.

Each organ consists of the following parts: —

1. The Capsule.
2. The Posterior Cup.
3. The Inner Cup.
4. The Central Mass.
5. The Anterior Cap.

1. *The Capsule* (Plate 9, Fig. 2, *c*) is about 0.04 mm. thick, and consists of rather loose connective tissue with small irregularly-shaped nuclei scattered in it here and there. The inner half of the thickness of this layer is deeply pigmented, the tissue being permeated by a mass of granular reddish-brown particles. The color and density of this layer agree with that to be noticed subsequently in other organs of this species, and it is in marked contrast with the very opaque black pigment seen in *Abraliopsis*. It is specially noteworthy that no similar layer was observed in the case of *Pyroteuthis margaritifera*.

2. *The Posterior Cup* (Fig. 2, *p. c.*) is built up of a large number of flattened oval or almost circular scales arranged in concentric layers, and leaving a hollow in the middle which contains the knob of the central mass. In section these scales, being thicker in the middle than at the edges, have an irregularly fusiform outline, and their concentric arrangement is very conspicuous. They stain very deeply with all the reagents yet tried (haematoxylin, carmine, and osmic acid). In some parts of the sections, notably in the more superficial layers, they appear to be homogeneous, but in other parts they present a frayed-out appearance, and are then seen to be made up of a number of interlacing fibrils with a less dense substance between them (Fig. 3). They vary much in dimensions; the largest, situated in the outer layers, measure 0.08 mm. in diameter by 0.03 in thickness, whilst those near the centre measure rather less than half these dimensions. The smallest of all are near the rim of the cup; they are sub-circular rather than fusiform in outline, and the diameter in many cases is only about 0.015 mm.

The scales are not in contact with each other, but are separated by interspaces of about 0.01 mm. in thickness, but varying much in different places. A delicate connective tissue, which stains only very feebly with the reagents above mentioned, fills up these interspaces. Here and there a radially directed passage is seen perforating several of the layers of scales, and in its centre may be seen a fibril which can often be traced to the central mass, and is presumably a nerve (Fig. 2, *n*). I have not, however, been able to trace these nerves to their source in the outer layers of the organ.

The actual form of the periphery of these scales is very difficult to determine, because the sections cut them at such varying angles. Tangential sections naturally give the best idea of it, but even here it is impossible to be certain that in any particular case the whole outline is shown. Two scales from the same series of sections are shown in Fig. 4, *A* and *B*.

Comparison of a number of such sections leads, however, to the belief that they are, speaking generally, oblong in form with rounded angles. Here and there a deep notch is seen in the margin of a scale, which gives passage to the nerve as mentioned above (Fig. 4, *B*, *n*).

The fibrillar structure is not shown in these tangential sections, but there are indications of the presence of lacunae which may, perhaps, be the interspaces between them. There are great variations in the constitution of the scales in the different sections, which I can only attribute to the state of preservation.

As compared with *P. margaritifera*, the scales are less regular in arrangement and not so homogeneous in structure.

3. *The Inner Cup* (Fig. 2, *i. c.*) might perhaps be more correctly termed a funnel, for where the bottom would be is a space through which passes the central mass to be described below, and not only is the diameter of the cup much larger at the top, but the thickness, too, increases very greatly towards what may be termed the rim, whilst at the bottom it tapers away to a thin edge. The internal diameter of the cup at the mouth is 0.2 mm. and at the bottom 0.09 mm., the depth 0.12 mm., and the thickness of the rim about 0.08 mm. It is composed of a mass of rather coarse fibres, which pass from the deeper portion to the more superficial, in layers parallel with the inner surface of the cup. Here and there an opening is left through the wall of the cup, apparently for the passage of a nerve. The fibres are much coarser and more closely packed, and stain much more deeply than those of *P. margaritifera*, in which species, too, there are no nerve channels to be seen, — a fact which is probably to be explained by the difference in size and arrangement of the central mass in the two species.

4. *The Central Mass* may be considered as divisible into two portions: (A) a spheroidal knob, and (B) a cone occupying the axis of the organ, and bearing on its apex the knob just mentioned.

(A) The *spheroidal knob* (*s. k.*) occupies the centre of the posterior cup, and constitutes, in fact, a nucleus around which the concentric layers of scales are arranged. It is about 0.1 mm. in diameter.

(B) The *axial cone* (*a. co.*) is situated in the centre of the inner cup. It projects through the bottom of the cup to join the spheroidal knob just described, and its length being greater than the depth of the cup, it projects some distance above it. Its sloping sides bulge outward somewhat, and its upper surface is convex. Its measurements are, basal diameter, 0.23 mm., apical, 0.09 mm., total length, including the spheroidal knob, 0.29 mm.

The bulk of this central mass is composed of large rounded parenchymatous cells, closely packed together. They may attain a diameter of as much as 0.02 mm., though many are much less. They consist of almost structureless protoplasm, which stains but slightly, and the cell-boundaries are indistinct.

The nuclei are large and spheroidal, measuring, in some cases, as much as 0.008 mm. in diameter. The nuclei in the more superficial parts of the organ are much larger than those situated more deeply.

In the centre of the thicker part of the cone are a number of scale-like bodies, placed at right angles to its axis (*c. s.*). There are from ten to twelve of these scales, measuring on an average 0.08 mm. in diameter, and 0.012 mm. in thickness. In structure they resemble, on the whole, those forming the posterior cup. They stain in the same way and to the same depth, but they are, on the whole, somewhat thinner in proportion to their diameter, and the fibres composing them are more obvious.

The form of this central mass constitutes the most important difference between the present species and *P. margaritifera*, for in the latter it is much shorter, the conical part only extending halfway along the sides of the inner cup, and being hollowed to receive the deeper portion of a structure I have called in that species the "internal cone."

5. *The Anterior Cap* (*a. c.*) covers the whole surface of the organ above the central mass. It has the form of a meniscus, the deeper surface, which rests upon the central mass, the inner cup, and the edge of the posterior cup, being deeply concave, whilst the upper surface is very convex. The greater part of it is composed of delicate wavy fibres interlacing with each other, and disposed in general parallel with the surface of the organ. Over the central mass the fibres are closer and more nearly parallel than over the lateral portions of the organ, where the texture is much more open, leaving rounded interspaces between them. A few nuclei were seen in these lateral parts, but none in the centre.

In the superficial layers of this anterior cap are a number of scales disposed parallel to the surface. They very closely resemble the scales of the outer layers of the posterior cup, but are somewhat larger in diameter and not quite so thick. They stain very deeply, and the more superficial ones are almost homogeneous in composition. There are a few of these scales in the deeper layers, but these are much smaller and show a tendency to break up into fibres something like the scales in the middle of the central mass.

II. THE SIPHONAL ORGANS (Fig. 1, *S. S.*) are paired and lie just within the hinder margin of the funnel, and are seen peeping out from beneath it when the mantle-cavity is opened. Each organ is bluntly pyriform in shape, or more accurately, perhaps, has the form of an acorn in its cup (Fig. 5). The smaller end is directed backwards, and at the inner side of the broad end is a kind of stalk by which it is attached to the ventral wall of the body. The free distal end is slightly pigmented, while the broad end is paler and the tip is a paler patch of a semi-transparent yellowish horn color. The length of the organ is about 0.9 mm. and the greatest diameter 0.8 mm.

In minute structure the siphonal organs closely resemble the ocular organs in their main features (Fig. 6). It will be sufficient therefore to enumerate their constituent parts and to mention the points in which they present differences. On the whole, they are more like the organs of *P. margaritifera*.

1. *The Posterior Cup* presents an outer coating of brown pigment (*c.*) which, however, is neither so thick nor so dense as that of the ocular organ. The scales composing the cup (*p. c.*) are thicker and more closely packed, and the connective tissue lying between them is more delicate. Most of the sections of this organ which I examined had been stained with carmine, and this fact may account for an apparent difference in the composition of the scales. They present a granular appearance, but do not show traces of a network like that described above. The form of the scales, judging by an examination of tangential sections, seems to be much less regular than in those above mentioned. They give off processes which branch, and in some cases almost appear as though they joined one scale with another, though I hardly think that such is the case. A somewhat oblique section, through the cup and the central knob, is shown in Fig. 8, and exhibits very clearly the concentric arrangement of the scales round the central knob.

2. *The Inner Cone* (*i. c.*) presents very little difference from that of the ocular organs except that the fibres composing it are more delicate. In some of the sections, they show a tendency to curve round the outside edge of the central mass, but this appearance I imagine is due to the sections not being cut exactly through the centre. In some places I detected a nerve passing through the inner cone in the same way as in the ocular organ.

3. *The Central Mass* (*c. m.*) is in general form intermediate between that of the ocular organs just described and that of *P. margaritifera*. It resembles the latter in the fact that it has no scales in its centre, and that it does not show distinct cell outlines, whilst in the fact that it extends as far as the rim of the inner cone it presents a likeness to *P. giardi*. It is made up of finely granular substance which stains only very faintly. The nuclei are very few and far between in the central knob, but are much more abundant towards the base of the conical portion, where many of them seem to be elongated in the direction parallel to the base of the cone.

4. *The Anterior Cap* (*a.c., a.c.′*) is made up of two layers of about equal thickness, but whereas in the ocular organs the deeper layer is composed of delicate fibrils and the more superficial of large scales, in this instance the scales are in the deeper part, whilst the fibrous portion is above. The scales differ from those of the posterior cup inasmuch as they show a marked tendency to become resolved into fibres (Fig. 7). One or two of the larger ones, however, show no fibres, but simply a granular structure similar to those of the posterior cup, but more pronounced. The superficial layer is almost homogeneous, but there can be seen in it delicate striations which run for the most part parallel with the surface. They are more clearly marked and less wavy in the deeper layers. The nuclei are fairly abundant and are fusiform in shape, with their long axes parallel to the direction of the fibres.

5. *The Collar* (*co.*) is the structure whose presence most clearly distinguishes the siphonal from the ocular organs. It surrounds the organ parallel with its equator just opposite to the deeper layer of the anterior cap. It is covered by the connective tissue capsule of the organ and in minute structure

consists of a number of delicate fibres arranged in bundles, passing outwards and forwards, parallel to each other. Its breadth is about 0.24 mm. and its thickness 0.12 mm.

III. THE BRANCHIAL ORGANS are paired and situated one near the root of each gill (Plate 9, Fig. 1, *B*, *B*) a little further back, and also a little deeper in the mantle-cavity than the actual attachment of the gill itself. They are of a flattened ovoid form with the longer axis directed rather forwards and inwards. The anterior and more superficial portion has a pale yellowish and rather lustrous appearance, behind which is a crescentic band, which looks as though it were due to subcutaneous pigment. The greatest length is about 0.75 mm. and the breadth somewhat less.

The structure of these branchial organs (Fig. 9) is much simpler than that of either of the sets just described. The following parts may be distinguished proceeding from the surface downwards: —

1. Over the surface is a thin layer (*s. l. c.*) of connective tissue varying from 0.005 to 0.015 mm. in thickness.

2. Beneath this is a delicate membrane (*s. m.*) which stains deeply and in which rounded nuclei can be made out here and there. It has an almost uniform thickness of about 0.006 mm.

3. The *central mass* (*c. m.*) constitutes by far the greatest part of the whole organ. It consists of a parenchymatous tissue of cells (Fig. 11), the largest of which are about 0.04 mm. in length, the smallest being less than half as much. The cell boundaries are very distinctly marked, and the protoplasm stains but slightly with haematoxylin. The nuclei are spheroidal and stain very deeply, so deeply that in most cases the nucleolus cannot be seen. The nuclei are more numerous and the cell boundaries less distinct in the layer which immediately underlies the delicate membrane just described.

Here and there may be seen amongst the cells a sort of lacuna in which is a granular mass with one or two nuclei. Sometimes this mass fills the lacuna, in others it seems to have shrunk away, in which case threads of protoplasm may be seen stretching out from it across the intervening space.

Towards the posterior edge the structure of the central mass undergoes a change (Fig. 10); instead of a parenchyma of rather elongated cells it assumes the appearance in its more superficial part of a fibro-cellular mass with nuclei scattered irregularly in it (*s. c.*). In its deeper portion is an ovoid mass of material similar to that composing the greater part of the central mass, but not so clearly marked off into cells (*cl.*). There is a kind of spiral striation obscurely indicated, as though the structure had in some way been formed round a centre.

4. A rather thick layer of very close compact tissue lies below the central mass (*c. t. c.*). It stains very deeply, and hence its minute structure is very difficult to decipher, but it apparently consists of a granular substance in which no definite elements can be made out. In the anterior half this layer forms the boundary of the organ.

5. A thin layer of pigmented cells covers the posterior half of the organ on

its deeper surface. It consists of a single layer of cells each with a definite rounded nucleus, *ep.* The pigment is of the reddish-brown character, which has already been described in speaking of the siphonal and ocular organs and appears to be contained in the inner portion of the cells (*p. l.*)

IV. THE ABDOMINAL ORGANS (Plate **9**, Fig. 1, A^1, A^2,) are two in number. The anterior (A^1) occupies the position of the three organs in *P. margaritifera* (Hoyle, :**02**, Fig. 1, *A 1, 2, 3*), though it is proportionately not quite so far in front of the branchial organs as it is in that species. The posterior one (Fig. 1, A^2) corresponds in position with that marked *A 4* in the figure of *P. margaritifera* just cited.

The anterior organ is slightly elliptical in a superficial view with the longer axis transversely; its axes measure 0.6 and 0.4 mm. respectively. The organ is nearly hemispherical (or more accurately hemi-ellipsoidal) embedded in the tissues, with its flat surface outwards and on the same level as the abdominal wall. On the anterior aspect a kind of thread or stalk runs from it, embedded in the tissues. One organ which I removed was cut into sections longitudinally, that is, by planes parallel to the sagittal plane of the body (Fig. 12); an examination of these showed it to be composed of the following structures:—

1. The Capsule.
2. The Pigment Layer.
3. The Cup.
4. The Inner Cone.
5. The Central Mass.
6. The Cover.
7. The Superficial Connective Tissue.

1. *The Capsule* of connective tissue (*c.*) covers the whole of the hemispherical surface of the organ; it is very thin (about 0.08 mm. thick) and almost structureless, though delicate fibres can be traced here and there, and a few nuclei are scattered in it.

2. *The Pigment Layer* (*p.*) immediately within the connective tissue just mentioned is thickest just opposite to the stalk and made up of reddish-brown granules like the similar layers in the other organs.

3. *The Cup* (*p. c.*) is made up of scales, so far as can be made out closely resembling those already described in other organs. The only sections I have of this organ are so deeply stained with braziline that it is impossible to make out any structure in them. This coat is on average 0.1 mm. thick.

4. *The Inner Cone* (*i. c.*) can be made out distinctly only on that side of the organ turned towards the stalk. It consists as in other cases of thin wavy fibres very deeply stained. It is much thinner and less conspicuous in this instance than in the others.

5. *The Central Mass* (*c. m.*) is much less regular in shape than in those cases already described, but shows traces of a constriction indicating a division into a deeper portion and a more superficial corresponding respectively to the spheroidal and conical portions of other cases. The minute structure is very badly

preserved; there are only very scanty traces of cell outlines and these principally in the superficial division. The nuclei are distinct and rounded or oval and much more numerous in the superficial part.

6. *The Cover* (*co.*) consists of a layer of scales which differ from any of those hitherto mentioned in form as well as in arrangement. They are greatly elongated and fusiform in outline, with one end blunter than the other. By this blunter extremity they are attached to the surface of the central mass and pass upwards from it in a more or less curved direction. Those which are furthest away from the stalk pass at an angle 45° to the surface. The next ones become successively more and more vertical and then begin to slope over to the other side. Those which cover the greater part of the central mass are inclined at an angle of about 30° to its surface, whilst at the stalk end they run almost directly into it. The thinner ends are drawn out into long delicate fibrils which curve round and become continuous with a limiting membrane forming the boundary of this layer.

7. *The Superficial Connective Tissue* (*s. c.*) is a layer about 0.016 mm. in thickness. It may be divided into three parts, the deeper and the more superficial being structureless, whilst the middle one is granular and has nuclei scattered at intervals along it. I have not been able to make out satisfactorily any nervous supply to the central mass in this instance, but it is quite possible that this may exist between the scales and the posterior cup as in other cases, for many of the sections were much broken. The Posterior Organ I have not examined in section.

Regarding the functions and homologies of the different parts of these organs, there is but little that can be said. The central mass I take to be the source of light, and it agrees in position though not in structure with the cells to which Joubin ('93, '94, '95) has ascribed a similar function in *Histioteuthis* and *Histiopsis*.

What I have termed the posterior cup appears to be closely similar to the corresponding part of the organ described by Joubin, and I think there can be little doubt that he is correct in regarding it as a reflector, though it is not exactly clear to me that one would naturally expect a body so constituted to discharge such a function. If this be admitted there would then be no reason for doubting that the superficial portions are a refracting apparatus.

(B.) Abraliopsis hoylei.

(Plate 10, Figs. 1–10.)

The luminous organs of this species are exceedingly numerous and are distributed pretty freely over the ventral surface and to some extent over the sides of the mantle, head, and third and fourth pairs of arms. Their arrangement is almost exactly bilaterally symmetrical with insignificant variations here and there. Considered more in detail, the disposition on the various organs is as follows: —

I. INTEGUMENTARY ORGANS.

A. *The Mantle* (Plate **10**, Fig. 1) : — The hinder part of the inferior surface is covered by a patch of organs (p), whilst in front of this they are placed in more or less regular linear series of which the following may be distinguished :

1. A double row (m^1) placed not very far from the median ventral line on either side and leaving a narrow free space between them.

2. A single irregular series (m^2) a little distance to the outer side of each of these.

3. A fairly regular single series which commences on either side at the prominent angle of the mantle-margin and passes backwards, converging towards the median line in its course (m^3).

All these six lines pass posteriorly into the patch of organs above mentioned.

4. Still further to each side is a wavy series of small organs more irregular and more widely spaced, extending nearly to the posterior extremity of the body, whilst dorsally to these again and situated on each side of the mantle, is a row of about half a dozen.

5. Along the margin of the mantle is a single series extending rather more than halfway round (m^4).

On the dorsal surface I detected only two or three minute organs, in a linear series parallel and near to the dorsal median line.

B. *The Siphon* (s) : — On the ventral face of the siphon are two groups, one on each side, leaving a clear space in the middle between them. Each group is roughly triangular in arrangement and consists of six to ten organs.

C. *The Head :* — The inferior surface of the head presents a brilliant array of these little organs. Most conspicuous perhaps is a longitudinal series occupying the median ventral line (h^1). Anteriorly this series bifurcates to pass up the fourth arm, and posteriorly it also bifurcates just in front of the tip of the funnel and the two limbs pass backwards and outwards along the margin of the funnel-groove. Parallel with this median series are two others, one on each side (h^2), which start from the line of organs along the edge of the funnel-groove, and pass forwards to the outer edge of the fourth arm on each side. Parallel with this line is a short row of three or four organs, between the funnel and the eye (h^3), and in the same line with it in front of the eye is a group of four to eight (h^4). A semicircle of organs is found round the ventral margin of each eye aperture.

D. *The Arms :* — Only the third and fourth pairs of arms are provided with these organs. On the *fourth* pair there is a single linear series on either margin of the ventral face. The line on the inner margin is the continuation of the bifurcated median line on the lower surface of the head (h^1) mentioned above. It extends about halfway up the arm and then ceases. That in the outer margin is a continuation of the series parallel with the median line (h^2) ; after passing forward a short distance it becomes discontinuous and is resolved into little linear groups of four to seven organs, separated by interspaces about equal in length to the groups.

On the *third* pair (Plate **8**, Fig. 2) there are little linear groups of two to six organs on the ventral surface along the line where the web or swimming membrane is attached to the arm.

There are no organs on the fin.

GENERAL APPEARANCE.

Under a lens the luminous organs of the mantle, arms, etc., present the appearance of small spots which are sometimes raised into papillae by the contraction of the intervening integument (Plate **10**, Fig. 3). They have a shining appearance and consist of a central white speck surrounded by a black ring. Under a low power of the microscope, the black ring is not quite even, but has a wavy external margin and in some cases is clearly seen to be made up of from five to seven separate pieces; this is still more clearly seen to be the case when sections are examined.

The white central portion presents a somewhat different appearance in different organs. In the largest ones it has a yellowish tinge and is more prominent and looks harder than in others. In the organs of smaller size it is paler and flatter, being of a dull pearly white color. In the smallest of all it is quite flat, and in these, too, the pigment ring is much less developed.

The diameter of one of the largest is about 0.2 mm., the central pearl-like spot being about 0.1 mm. in diameter. They vary considerably in size, the smallest being about half as big as the largest. They lie in spaces between the chromatophores.

MINUTE STRUCTURE.

The preparation of complete series of sections of these organs was found to be quite impossible, owing to the hardness of the posterior part of the interior. The cutting went on quite satisfactorily until about halfway through, when the whole of the remainder of the inside was torn out by the razor, generally spoiling the adjacent tissues on one side and damaging all the remaining sections of that particular organ. In what follows the account of the posterior part has been compiled from a few very indifferent fragments.

The organ lies embedded in the fibrous connective tissues under the epidermis and is below the level of the chromatophores with which it does not seem to come into any relation. There is a slight depression in the subcutaneous muscle underneath each organ. There is a series of large sinuses surrounding the posterior portion of the organ (Figs. 4 to 8, s.). The inner wall of these is formed by a thin layer of connective tissue surrounding the pigment cup, whilst the outer is formed by the sub-cutaneous connective tissue.

The shape is in general spheroidal, the axial diameter, perpendicular to the surface of the integument, being rather longer than the transverse diameter.

In general, too, the deeper half is a little more pointed than the more superficial, so that the form of the organ approaches that of a peg-top (Fig. 4).

Each organ consists of the following parts : —

1. The Lens.
2. The Pigment Cup.
3. The Inner Cup.
4. The Posterior Hemisphere.
5. The Internal Cone.

1. The *Lens* (Plate **10**, Figs. 4, 5, *l*) consists of a pale structureless material which is not acted upon by staining fluids. It is divided up by faint irregular lines of demarcation and occasional cleavage gaps into more or less rounded masses, in the interstices between which nuclei are found here and there.

Viewed in a section taken along the axis (Fig. 4) the lens is seen to be separated by an equatorial groove into an inner and outer portion. These differ somewhat in their structure. In the deeper portion, the pieces of which the lens is built up are rounder and more irregular, their depth being not infrequently equal to their transverse diameter. In the more superficial portion, these pieces are more flattened and taper to their edges on either side, and are fitted into each other something like flattened epithelial cells near the surface of the epidermis. The nuclei are modified in accordance with the tissue in which they are found, being rounded or sub-polygonal in the deeper portion and flattened in the superficial. The groove above mentioned receives the inturned edge of the pigment cup.

2. The *Pigment Cup* (Figs. 4, 6, 7, 8, *p. c.*) is in the shape of a goblet without a stem and with the edge somewhat inverted. It is built up of a number of separate pigment masses which are seen in section to be hollow sacs with a thick lining of black pigment, a structure which suggests the view that they are possibly modified chromatophores. Their boundaries are not always visible, and hence it is impossible to determine their exact number, the more so as the sections of the posterior part of the organ are never entire. In a horizontal section taken just below the lens (Fig. 6) there are usually six of these which make up a more or less complete ring, and in such cases the boundaries of the individual sacs are pretty easy to determine. This ring appears to correspond to the inturned edge of the pigment cup. In the deeper portions the hollow cavities of the pigment masses are not so easily seen, nor are the boundaries so distinct. The aperture of the cup, as above stated, is occupied by the lens. In its bottom is situated the posterior hemisphere, whilst the remainder is lined by connective tissue with numerous large nuclei (Figs. 4, 7, 8, *c. t*)

3. *The Inner Cup* (Figs. 4, 7, *i. c.*) lies inside the pigment cup just described. It might perhaps be more correctly described as a funnel, for a conical perforation runs right through its middle, diminishing in diameter as it descends. The substance of which it is composed stains only very faintly. In an axial

section (Fig. 4) it is marked by striations which run, roughly speaking, parallel to its outer boundary and seem to indicate that it is built up of irregular rods packed closely side by side. A fair number of more or less complete axial sections of this structure have been obtained, but I have only been able to discover one or two fragmentary transverse sections. These show the cut ends of the rods packed together with a kind of radiating arrangement from the central aperture towards the circumference (Fig. 7). Between these rods, nuclei occur very sparingly and elongated in a direction parallel with the rods themselves.

4. *The Posterior Hemisphere* (Figs. 4, 8, *p. h.*) occupies the deepest portion of the interior of the organ just within the pigment cup. It has, roughly speaking, the form of a hemispherical bowl with the rim turned inwards. Its thickness is about equal to one-third of its diameter and is such that only a very small spheroidal space is left in the middle of it and is occupied by the end of the internal cone. The thickness is made up of a series of concentric layers which in the sections appear to be slightly separated one from the other, especially near their edges, but this may be an effect produced by the process of cutting. This substance takes up the stain only faintly, and appears to be somewhat denser in consistency than the inner cup. No nuclei have been noticed anywhere in its substance.

5. *The Internal Cone* (Figs. 4, 6, 7, *i. co.*) is situated with its base against the deeper surface of the lens, whilst its spheroidal apex occupies the internal cavity of the posterior hemisphere just described. It is deeply subulate and is bounded by the internal surface of the inner cup. Under a high power it is seen to be composed of finely granular protoplasm, which is not much affected by the staining fluid. No definite cell boundaries can be seen, but it contains a considerable number of nuclei. Those near the base of the cone are small and ovoid in shape, whilst the deeper ones are elongated in the direction at right angles to the axis. Some of them are so long as to occupy a considerable portion of the diameter of the cone. A section parallel with the surface of the integument (Fig. 6) just beneath the lens shows that these elongated nuclei have their long axes curved to correspond with a circle drawn round the centre of the cone. They are situated in the deeper layers, whilst the round and ovate nuclei occupy the circumference.

I have not been able to trace the nerve supply to these organs.

II. SUB-OCULAR ORGANS.

Beneath each eyeball, covered in the living condition by the integument, is a row of five organs, placed at equal distances from each other along the equator of the ball (Plate **10**, Fig. 2). They are visible in the living animal (Plate **1**, Fig. 3) evidently by reason of the transparency of the integument.

They are slightly elevated papillae of a clear yellowish-brown color. The three central ones are the smallest and are about 0.18 mm. in diameter, whilst the two extreme ones measure 0.35 mm. in diameter. The organs are embedded in the connective tissue capsule which lies over the sclerotic coat o the eye.

MINUTE STRUCTURE (Figs. 9, 10).

In the deepest portion of the larger organs is a lenticular mass of tissue about 0.13 mm. in diameter and 0.07 mm. in thickness (*l.*). It is made up of irregularly shaped masses which are to all appearance structureless, of a pale yellowish-gray color and not affected by the haematoxylin with which the preparation has been stained. Beneath this mass is a thin layer of connective tissue (*c.*) with sparsely scattered nuclei in it, whilst above and around it is a thicker layer of connective tissue (c^1) with very numerous, deeply stained nuclei of variable shape, mostly, however, with their longer axes parallel to the surface of the organ.

The greater part of the organ is made up of a series of delicate fibrils (*f.*). These arise from a thin structureless layer lying upon the connective tissue coat of the lenticular mass just described. They are of extreme tenuity and radiate outwards in all directions from horizontal to vertical, producing in the section the appearance of a fan. The fibrils are, however, none of them exactly straight, but curved in such a way that in the deeper half of their course they are concave towards the axis of the organ and subsequently convex, becoming generally concave again where they merge into the clear zone to be described below. The structureless mass from which they arise does not take up the staining fluid, but the greater part of the fibrils has become very deeply colored. The terminal fifth of each fibril remains unstained and appears to be thinner than the remainder, so that a narrow clear zone appears in the section to bound the surface of the organ (*z.*).

On that side of the organ which may be called the inner, as it is turned towards the remaining organs of the same eye, the connective tissue (*i.c.*) encroaches to some extent over its surface in the form of a thin layer gradually becoming thinner and ceasing at a distance of about 0.01 mm. from the edge. This overlapping portion of the connective tissue contains a few nuclei.

On the other side of the organ it becomes flattened out and extends as a horizontal prolongation for a distance nearly equal to the diameter of the lenticular portion. This part consists of delicate fibrils (*h.f.*) very like those described above, but interspersed between them are strands of the yellowish-gray material described above as forming the small lenticular body in the deepest portion of the organ. Ovoid nuclei are scattered here and there among them. The arrangement of the fibrils here is very much less regular than in the central fan-like portion.

The smaller organs (Fig. 10) present a certain resemblance in structure to the large ones above described. In the deepest portion is a lenticular mass (*l.*) of unstained tissue very closely resembling that above described. It is, however, broader and flatter not only in relation to the size of the organ, but also absolutely, measuring 0.2 mm. in diameter and about 0.05 mm. in thickness. It rests upon a mass of connective tissue (*c.*) much thicker than that forming the base of the larger organs, being in fact thicker than the lenticular mass itself. Above it is a similar layer of connective tissue (c^1.) with thickly distributed nuclei very similar to that described above. The radiating fibrils (*f.*) in this case seem to spring directly from the connective tissue itself without any intervening structureless mass. They are thicker, shorter, and more closely packed than in the larger organs, and as they do not thin out towards their extremities there is no clear zone produced on the outer surface.

These smaller organs, too, appear to be much more brittle than the larger ones, for only in very few cases have I found their sections at all complete.

The only organs which at all approach the pallial organs just described are to be found in the somewhat closely allied species *Abralia oweni*, which has been the subject of a memoir by Professor Joubin ('95). In common with the form under consideration they are of a spheroidal shape and are surrounded in their deeper half by sacs of pigment which may be modified chromatophores. The network of vessels described and figured by Joubin (p. 11 [222], Fig. 6) appears to be replaced by the lacunae above mentioned. Here, however, the resemblance ceases; it is only with difficulty that the internal structures can be regarded as in any way homologous with each other.

Judging by composition alone, it might be said that the crystalline style (*tige cristalline*) of Joubin is represented by the funnel-like apparatus of *Abraliopsis*, but even here differences obtain, for whilst the style occupies the very centre of the organ, the funnel is hollow and in its middle is found a cellular plug. Furthermore, the style is described as consisting of concentric layers and quite devoid of nuclei, whereas the funnel is made up of rodlike elements, arranged around a centre, it is true, and nuclei, though in small numbers, are present.

There is nothing, apparently, in the organs of *Abralia* corresponding either to the lens-like body, to the central cone, or to the hard posterior cup in *Abraliopsis*, whilst on the other hand the latter shows nothing like the hood (*calotte*) or the network (*reseau*) observed in the former.

In the face of discrepancies such as these in the case of forms which do not seem to be far apart systematically, the elucidation of the functions of the different parts on anatomical or histological grounds seems wellnigh hopeless.

I am not acquainted with any organs at all resembling those found on the eyes of *Abraliopsis hoylei*.

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PLATE 1.

Fig. 1. *Stauroteuthis hippocrepium*, sp. n.

A ventral view of the specimen from Station 3374, showing the form of the body and fins and the mantle aperture enclosing the funnel; about natural size.

Fig. 2. *Bathyteuthis abyssicola*.

Dorsal aspect of the specimen from Station 3358; somewhat enlarged.

Fig. 3. *Abraliopsis hoylei*.

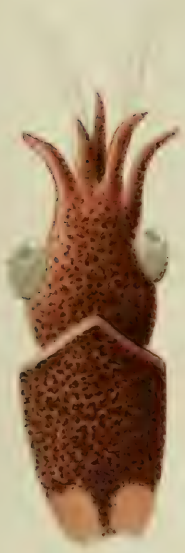
Ventral aspect of the specimen from Station 3414, showing the luminous organs under the eyes as well as the rows of them down the arms and the lower surface of the mantle; slightly enlarged.

Figs. 4, 5. *Taonius*, sp.

4. Dorsal aspect of the specimen from Station 3414; × $\frac{3}{2}$.

5. Outline sketch of the head and arms more highly magnified. The diameter of the mantle is too large in proportion to the length, judging from the animal as preserved in alcohol.

The figures on this plate are from sketches made on the expedition by Mr. Westergren.



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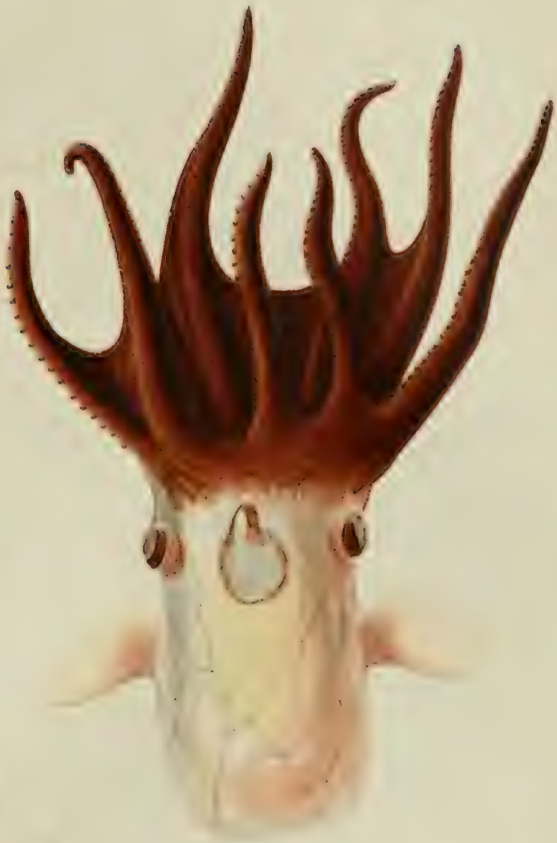

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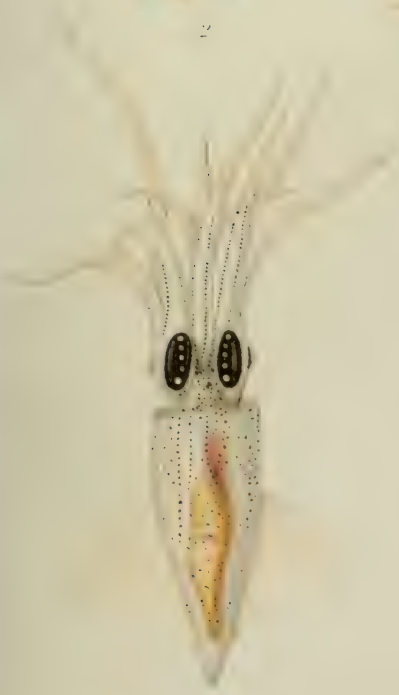

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PLATE 2.

Fig. 1. *Stauroteuthis hippocrepium*, sp. n.

View of the same specimen figured in Plate 1, Fig. 1, arranged to show the interior of the umbrella and the single row of suckers on each arm; about natural size.

Fig. 2. *Froekenia clara*, g. et sp. n.

Sketch of the unique specimen, No. 7961, from Station 3358, to show the general form and color; × 2.

Fig. 3. *Abraliopsis* sp.

Drawing of a young specimen taken on March 11, 1891, enlarged. The note on the drawing gives the Station number as Hy. 2620; on the label in the bottle appears 2620 corrected to 2619. As the two Stations were on the same day the discrepancy is unimportant.

The figures on this Plate are from sketches made on the expedition by Mr. Westergren (Figs. 1 and 3) and Mr. Alexander Agassiz (Fig. 2).

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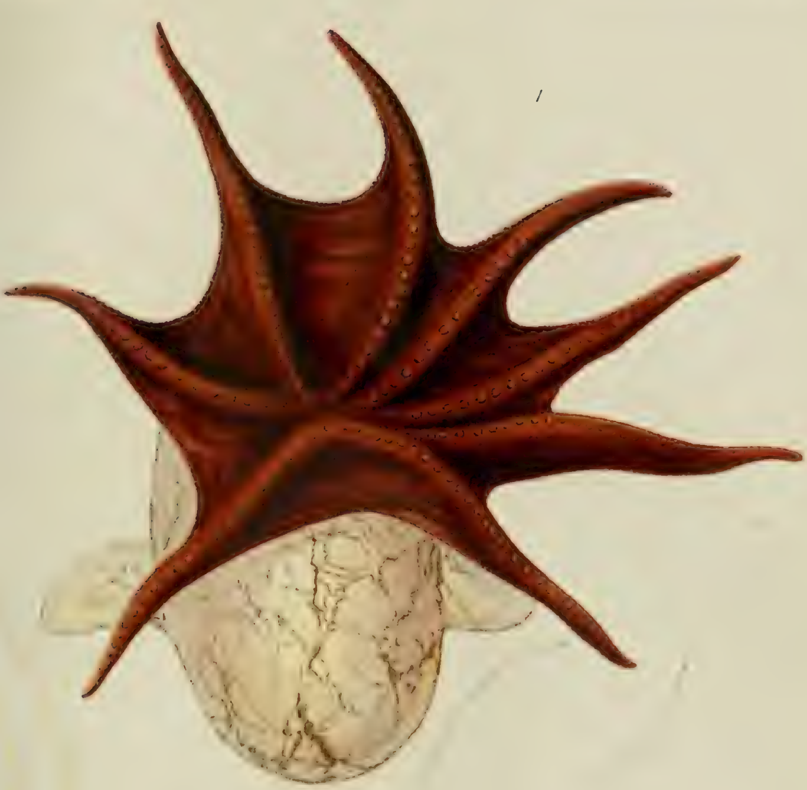

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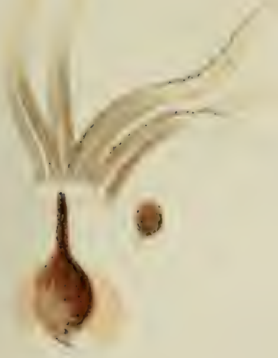

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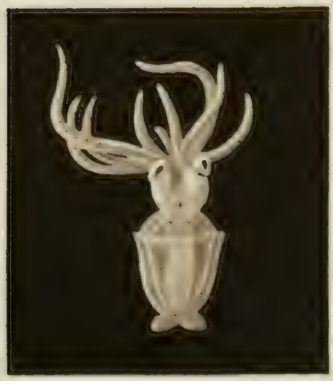


PLATE 3.

Figs. 1–4. *Stauroteuthis hippocrepium*, sp. n.

1. Side view of the internal cartilage; × $\frac{3}{2}$.

2. Sketch of dorsal aspect, after removal of the integument, showing the relative positions of the cartilage and the fin; × $\frac{3}{2}$.

3. Proximal end of the fin showing the hollow for articulation with the side of the cartilage; × 2.

4. Portion of the third arm on the right side, showing the cartilaginous nodule at the attachment of the margin of the web to the ventral aspect of the arm; × $\frac{3}{2}$.

Fig. 5. *Froekenia clara*, sp. n.

Sketch showing the form of the cartilage and the form and attachment of the fin; magnified rather more than 2 diameters.

Figs. 6–11. *Bolitaena microcotyla*.

6. Dorsal aspect, from a photograph; × 2.

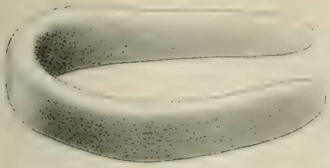
7. Outline sketch of the same; the reference letters point to the tips of the arms on the right and left sides respectively.

8. Ventral aspect, from a photograph; × 2.

9. Outline sketch of the same, showing *S*, siphon; *M*, mantle-opening; *3 R*, tip of the third arm on the right side.

10. Outline sketch from the right side; *S*, aperture of the siphon; *E*, eye; *B*, position of the buccal mass; *M*, mantle-opening; *I–IV*, the arms of the right side.

11. Ventral aspect showing the funnel and the right side of the mantle-cavity laid open; × 4.



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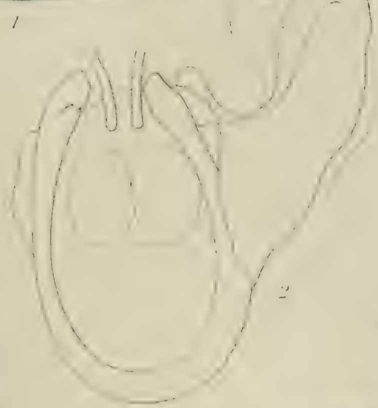

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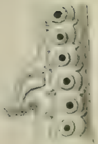

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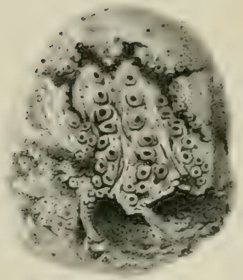

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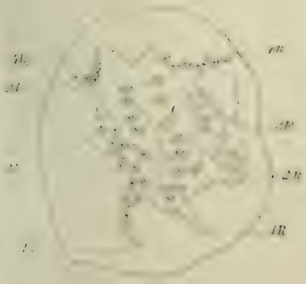
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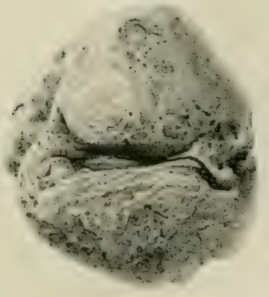

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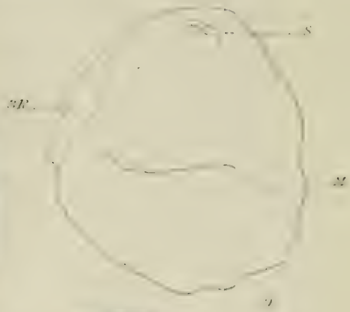

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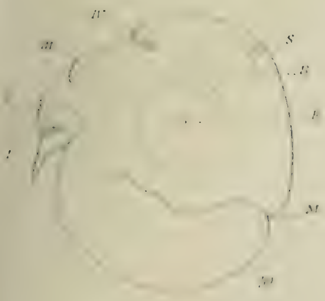

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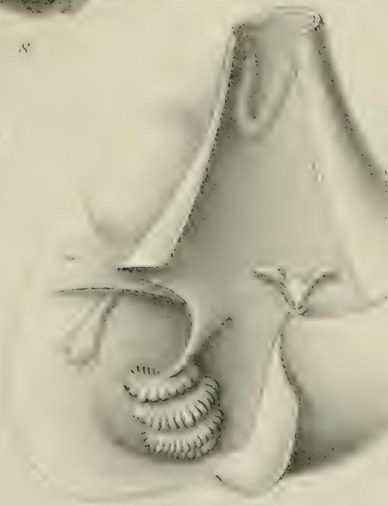

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PLATE 4.

Fig. 1. *Bolitaena microcotyla.*

A portion of the radula; × 70.

Fig. 2. *Polypus pusillus.*

A young specimen, from a photograph; natural size.

Figs. 3, 4. *Polypus oculifer.*

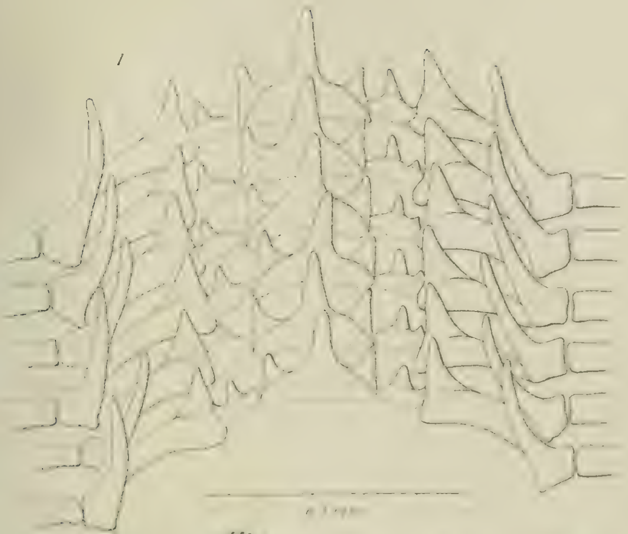
3. The type specimen from a photograph; natural size.
4. Side view of body and base of arms, to show the ocellar spot; natural size.

Fig. 5. *Polypus pusillus.*

The extremity of the hectocotylized arm; × 4.

Figs. 6–9. *Tremoctopus scalenus*, sp. n.

6. The type specimen from a photograph; natural size.
7. The ventral aspect of the body to show its general shape, with the mantle aperture, funnel and eyes; × 2.
8. Inner aspect of one of the arms; × about 6.
9. Lateral aspect of one of the arms; × about 6.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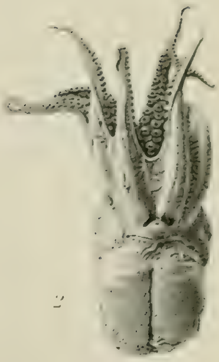
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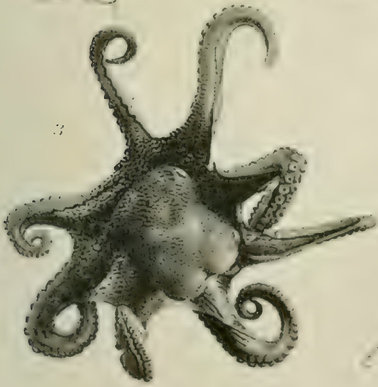
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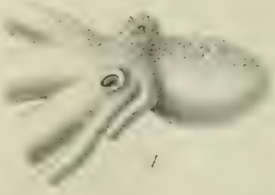
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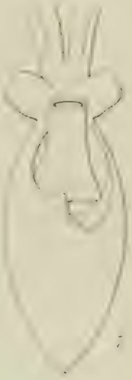
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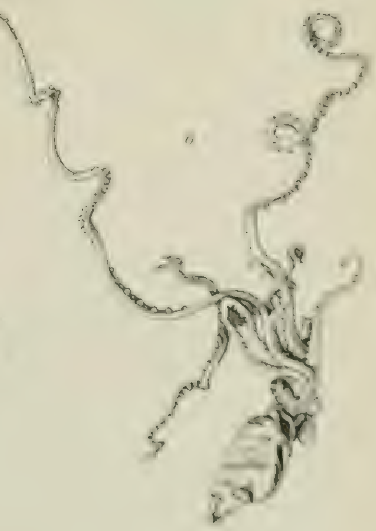
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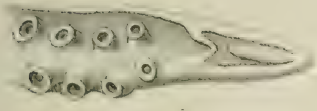
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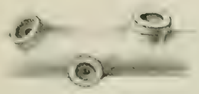
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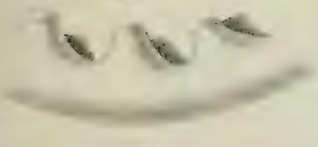
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PLATE 5.

Fig. 1. *Polypus pusillus.*
A portion of the radula; × 45.

Fig. 2. *Polypus januarii.*
A portion of the radula; × 40.

Figs. 3–9. *Polypus*, sp.

3. Ventral view of a specimen showing the yolk-sac protruding from between the arms; from a photograph; natural size.

4. Dorsal view of another specimen; from a photograph; natural size.

5. Portion of an arm near the distal extremity, showing the double row of suckers changing into a single one; × about 4.

6. Portion of an arm near the middle, showing the double row of suckers — in reality a zigzag; × about 4.

7. Portion of an arm near the proximal extremity showing the single row of close-set suckers; × about 4.

8. Ventral aspect, the mantle opened and turned back on the left side, to show the reflected posterior margin of the funnel and the curved ridge on the inner surface of the mantle which fits in behind it; × 2.

9. Portion of the radula; × 120.

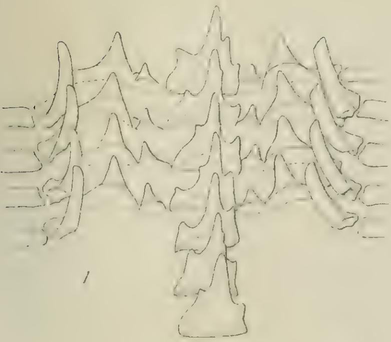
Figs. 10, 12. *Japetella prismatica.*

10. Portion of the third left arm, showing the enlarged suckers; × 2.

12. Funnel organ, from the type in the "Challenger" Collection; × 3.

Fig. 11. *Eledonella diaphana.*
View of the dorsal wall of the funnel, showing the funnel organ; × 4.

Fig. 13. *Loligo diomedeae*, sp. n.
Dorsal view of the body; natural size.



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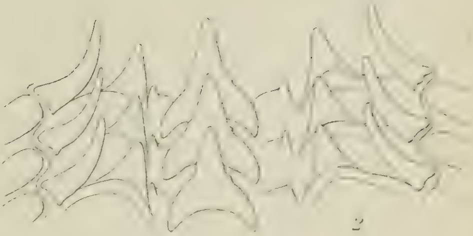

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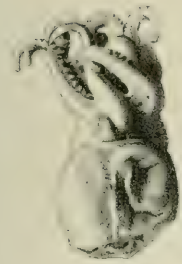

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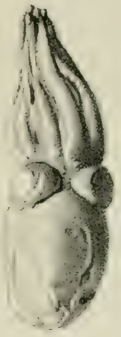

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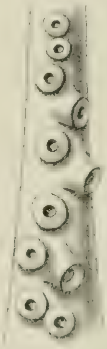

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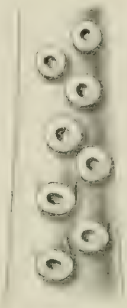

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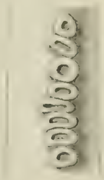

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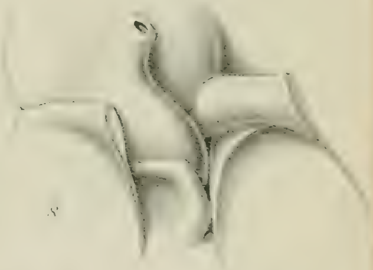

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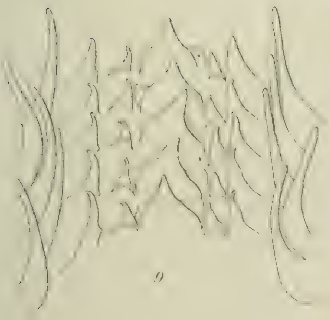

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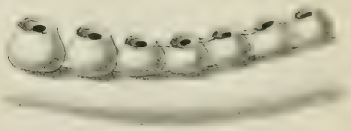

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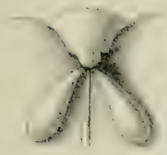

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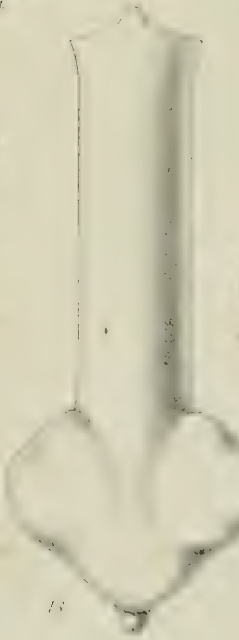

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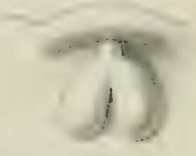

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PLATE 6.

Figs. 1–7. *Loligo diomedeae*, sp. n.

1, 2. Sucker from the third right arm; × 60.

3. A large tentacular sucker; × 35.

4. Portion of the rim surrounding the horny ring; × 170.

5. A lateral tentacular sucker; × 60.

6. Portion of the horny ring and surrounding rim; × 170.

7. A sucker from the outer lip; × 45.

Figs. 8–11. *Mastigoteuthis dentata*, sp. n.

8. Sucker from the middle of the ventral arm; × 55.

9. Portion of the horny ring and adjoining rim, indicated by the dotted lines in Fig. 8; × 170.

10. Female specimen with the mantle cavity laid open; natural size.

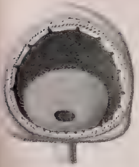
11. Male specimen with the mantle cavity laid open; × $\frac{3}{2}$.

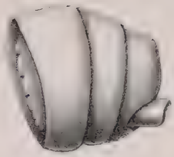
The last two figures from drawings by Dr. J. H. Ashworth.

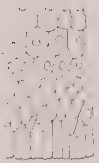
Figs. 12, 13. *Taonius*, sp.

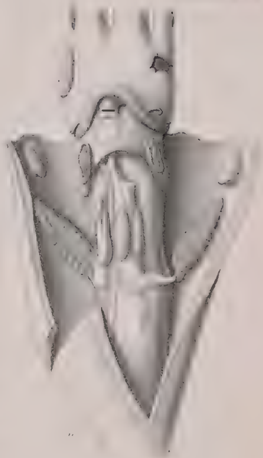
12. Portion of the stalk of the tentacle showing the rudimentary suckers; × 35.

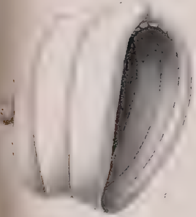
13. Posterior extremity of the mantle and pen; × 15.

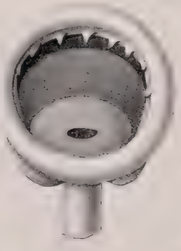


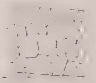


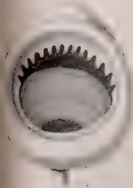


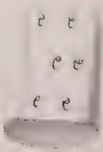












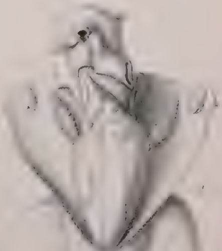
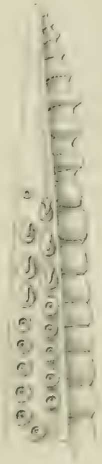


PLATE **7**.

Pterygioteuthis giardi.

1. Left dorsal arm of specimen No. 7966; × about 8.
2. Left upper lateral arm of the same specimen; × about 8.
3. Left lower lateral arm of same specimen; × about 8.
4. Left ventral arm of the same specimen; × about 8.
5. Left tentacle of the same specimen; × about 8.
6. Dorsal aspect of the whole animal; combined from several specimens; × 2.
7. Portion of radula of specimen No. 7959 B; × 180.
8. Front view of a hook-bearing sucker of specimen No. 7966; × 64.
9. Side view of a similar sucker; × 64.

1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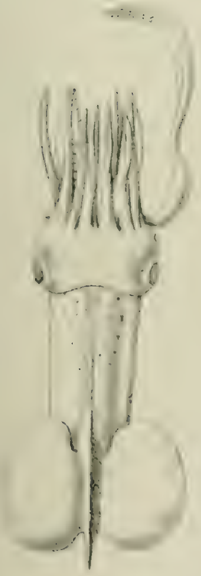


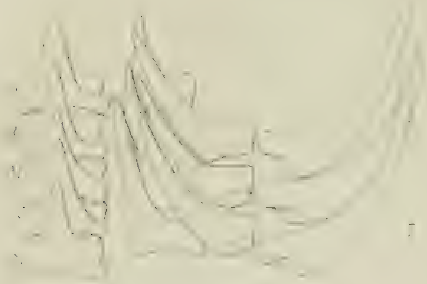
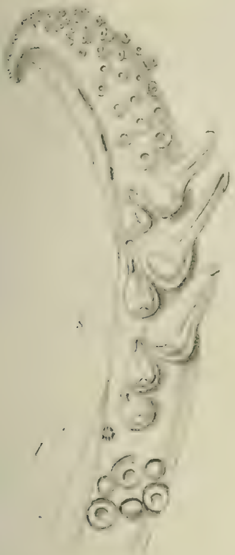


PLATE 8.

Abraliopsis hoylei.

1. Left tentacular club of the specimen No. 7964; × about 20. A sucker appears to have been lost from the position marked *S*.
2. Right lower lateral arm of specimen from St. 3414; × 3¾.
3. Left dorsal arm of the same specimen; × 3¾.
4. Left ventral arm of the same specimen; a female; × 3¾.
5. Left ventral arm of a male; figure combined from all the male specimens; × 3¾.
6. Basal portion of the same; more highly magnified; × 7.
7. Portion of the right upper lateral arm, showing the lappets and the minute papillae; specimen No. 7960 B; × 12.
8. Tip of the right dorsal arm of the same specimen; × 35.
9. Portion of the radula of the same specimen; × about 200.



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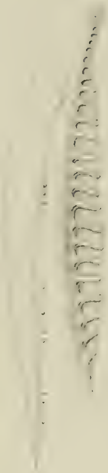

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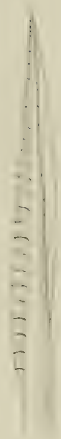

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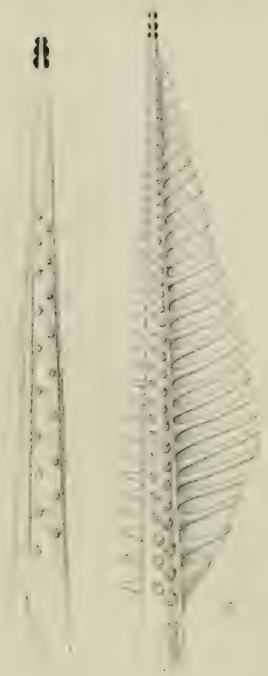

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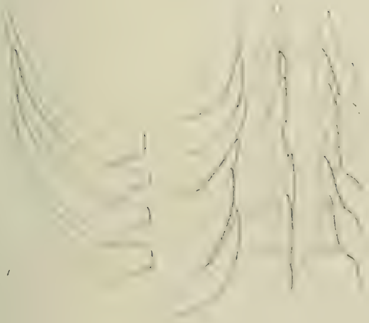
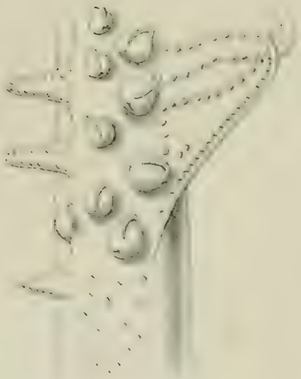
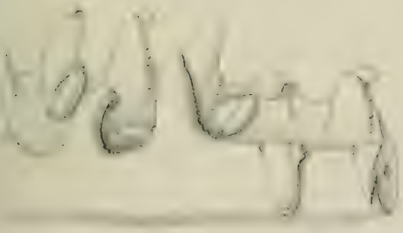






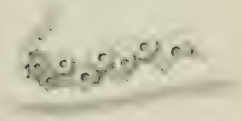
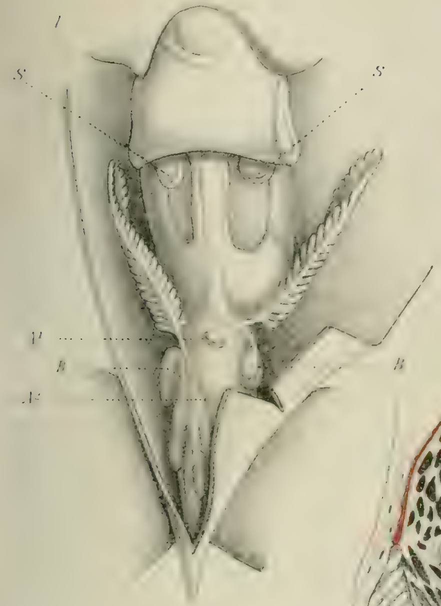
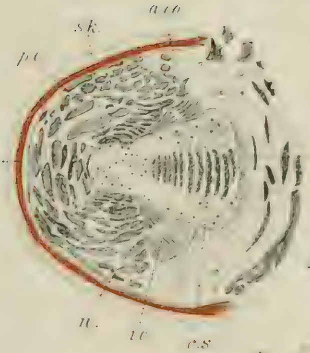


PLATE 9.

Pterygioteuthis giardi.

1. Ventral aspect of the animal, after the mantle-cavity has been opened, showing the position of the luminous organs ; × 5.
   S., *S.*, Siphonal organs ; *B.*, *B.*, Branchial organs ; A^1, A^2, Abdominal organs.
2. Axial section of one of the larger ocular organs ; × 77.
   a. c., anterior cap ; *a. co.*, axial cone ; *c.*, capsule ; *c. s.*, central scales ; *i. c.*, inner cone ; *n.*, nerve ; *p. c.*, posterior cup ; *s. k.*, spheroidal knob.
3. Section through several scales from the inner layers of the posterior cup ; × 420.
4. Surface view of two scales from the posterior cup ; × 125.
   n., nerve.
5. View of the right siphonal organ ; × 10.
6. Section of a siphonal organ ; × 88.
   a. c., posterior layer ; and *a. c.*^{1}, anterior layer of anterior cap ; *c.*, capsule ; *c. m.*, central mass ; *co.*, collar ; *i. c.*, inner cone ; *p. c.*, posterior cup.
7. Scales from the deeper layer of the anterior cap ; × 250.
8. A somewhat oblique section through one of the siphonal organs, showing the concentric layers of scales composing the posterior cap ; × 130.
9. Antero-posterior section of one of the branchial organs ; × 55.
10. The lower portion of Fig. 9 ; × 130.
11. Section of the superficial layers of the upper surface of the organ ; × 270.
    Explanation of letters in Figs. 8–11 : *c. m.*, central mass ; *c. t. c.*, connective tissue capsule ; *el.*, ellipsoidal mass ; *ep.* epithelial layer ; *p. l.*, pigment layer ; *s. c.*, superficial connective tissue ; *s. l. c.*, superficial layer ; *s. m.*, superficial membrane.
12. Sagittal section of the anterior abdominal organ ; × 75.
    c., capsule ; *c. m.*, central mass ; *co.*, cover ; *i. c.*, inner cone ; *p.*, pigment layer ; *p. c.*, posterior cup ; *s. c.*, superficial cells.


1
S
S
p'
B
N


sk.
aco
pc
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ac
2
n.
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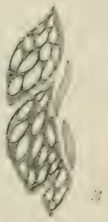
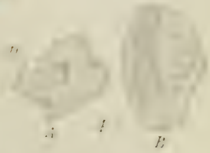
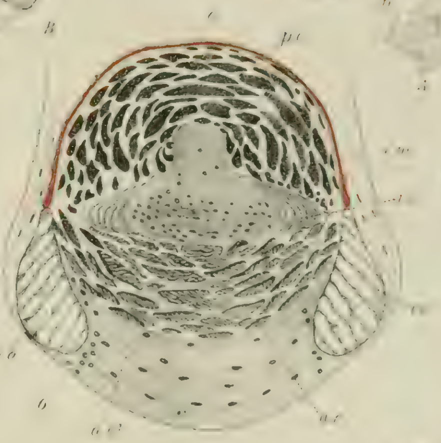
es

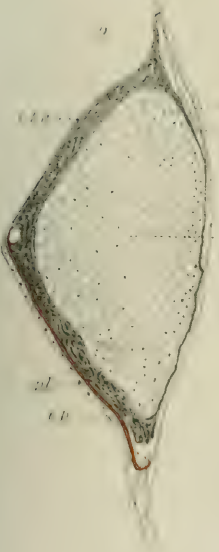

3


n
A
4
B

5


B
c
pc
cm
ac
ao
6
ac'

7


9
clt
slc
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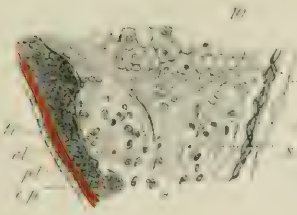
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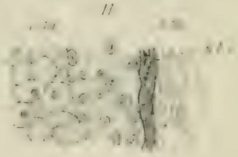
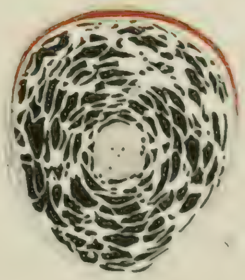

11
cm
sm
slc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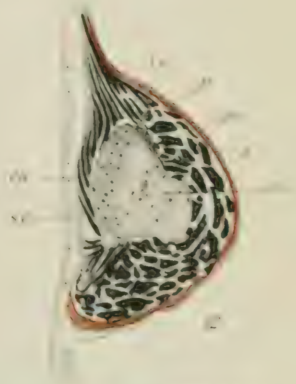

p
cm
sc
12

PLATE 10.

Figs. 1–10. *Abraliopsis hoylei.*

1. Ventral aspect, showing the arrangement of the luminous organs; × 2½. h^1, medio-ventral line dividing anteriorly to pass along the inner margin of the ventral arms and posteriorly to bound the siphonal depression; h^2, medio-lateral line passing forwards along the outer margin of the ventral surface of the arm; h^3, h^4, lateral line of organs; *s*, group of luminous organs on the under surface of the siphon; m^1, m^2, m^3, m^4, successive rows of organs on the lower surface of the mantle; *p*, patch of organs from which the above lines arise.
2. Sketch of the inferior surface of the left eye, showing the position of the luminous organs; × about 3.
3. Portion of the surface of the mantle, showing luminous organs and chromatophores; × about 20.
4. Axial section of a luminous organ, from the arm; × 150.
5. Horizontal section through the lens; × 150.
6. Horizontal section through the upper part of the pigment cup; × 150.
7. Similar section more deeply situated; × 150.
8. Similar section through the posterior hemisphere; × nearly 200.

   Explanation of letters in Figs. 4–8: *c. t.*, connective tissue; *i. c.*, inner cup; *i. co.*, internal cone; *l.*, lens; *p. c.*, pigment cup; *p. h.*, posterior hemisphere; *s.*, sinus.
9. Section nearly in the equator of the eyeball through one of the larger ocular organs; × 75.
10. Similar section through one of the smaller ocular organs; × 75.

    c., lower layer of connective tissue; $c.^1$, connective tissue above and around the lenticular mass; *f.*, fibrils; *h. f.*, horizontal fibrils; *i. c.*, inner mass of connective tissue; *l.*, lenticular mass; *z.*, outer zone.

Fig. 11. *Cranchia scabra.*

View of the mouth and oral aspect of the arms and left tentacle; × 20.

Fig. 12. *Argonauta*, sp.

Internal and external aspects of the shell of a young specimen; × 2.

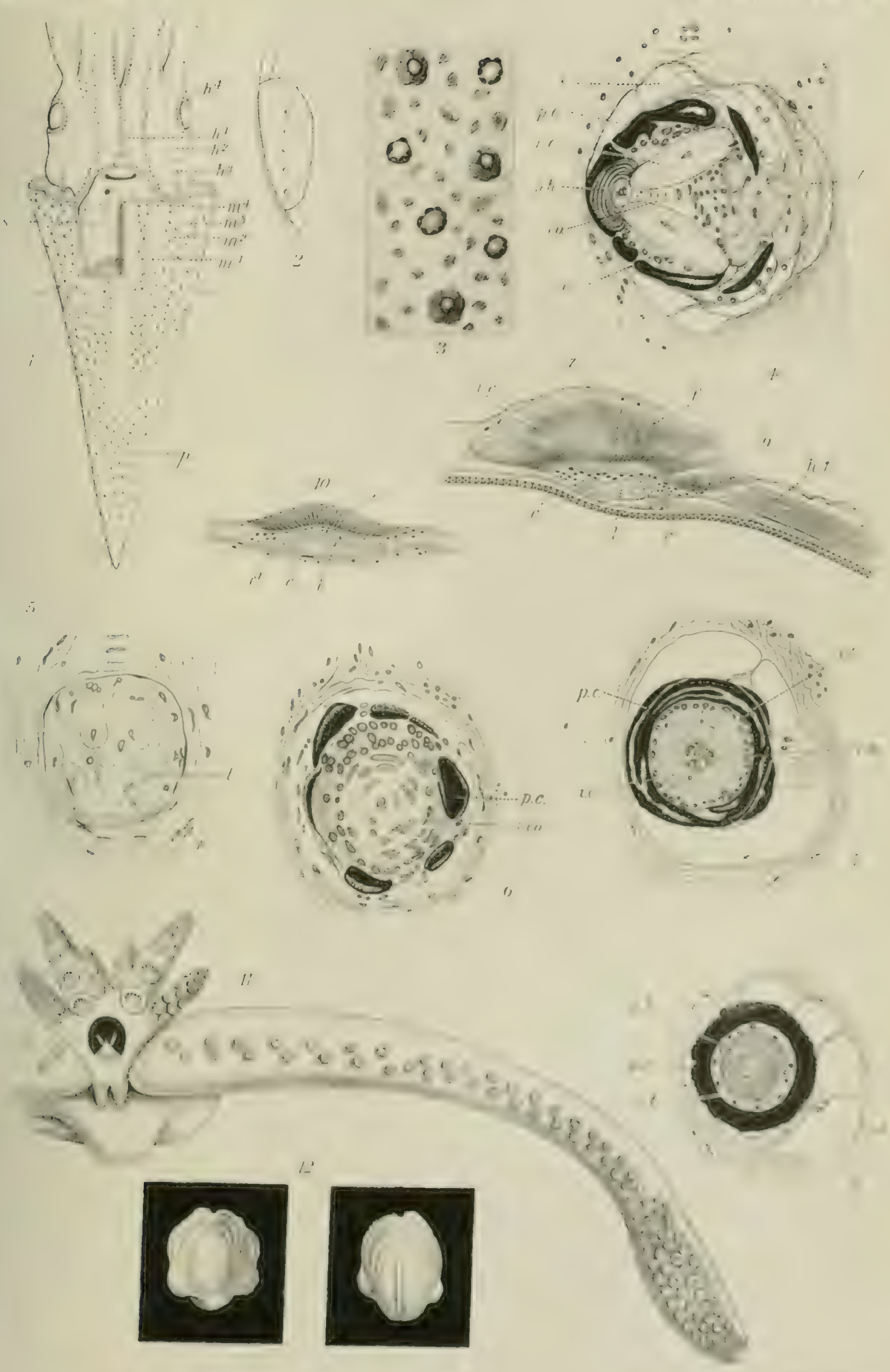
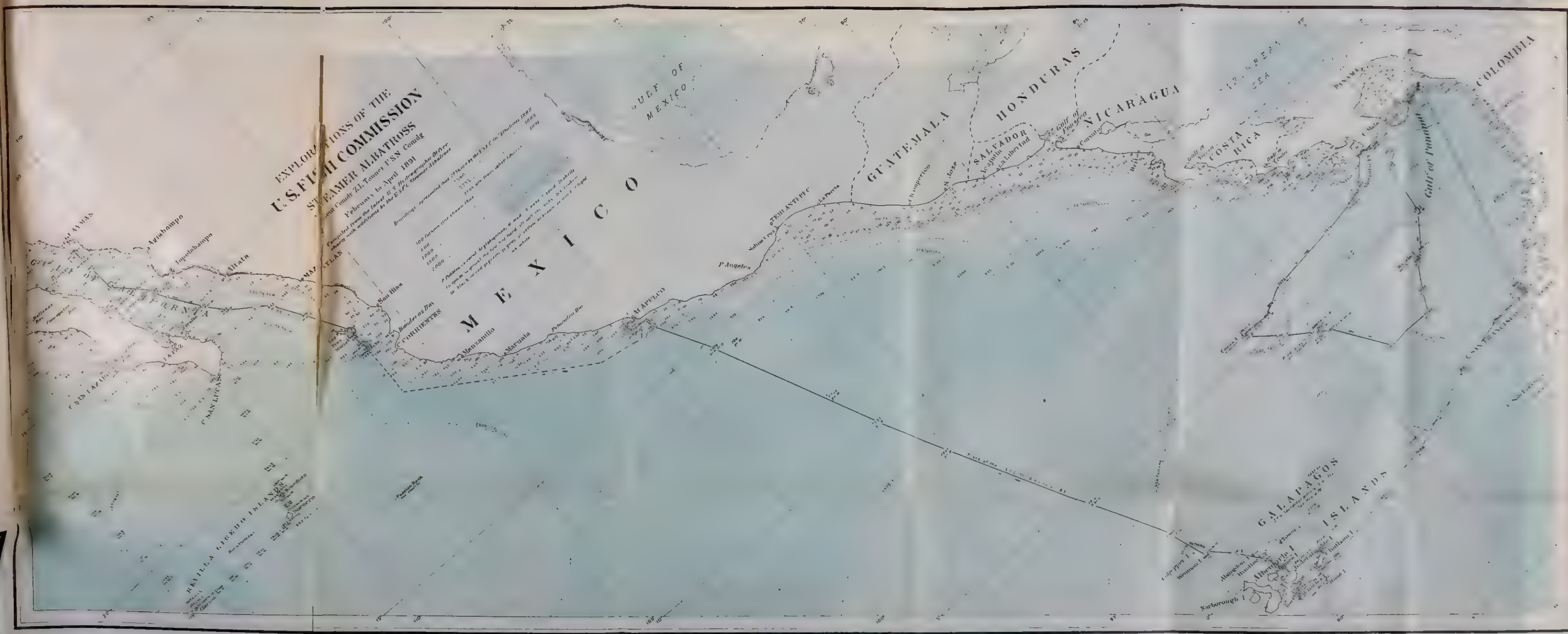

h4
h1
h2
h3
m4
m3
m2
m1
1
p
2
3
p.c
r.c
s.h
c.o
l
4
7
r.c
l
o
h1
c
l
c
10
c
c
l
5
l
p.c.
c.o
6
p.c.
11
12

PLATE 11.

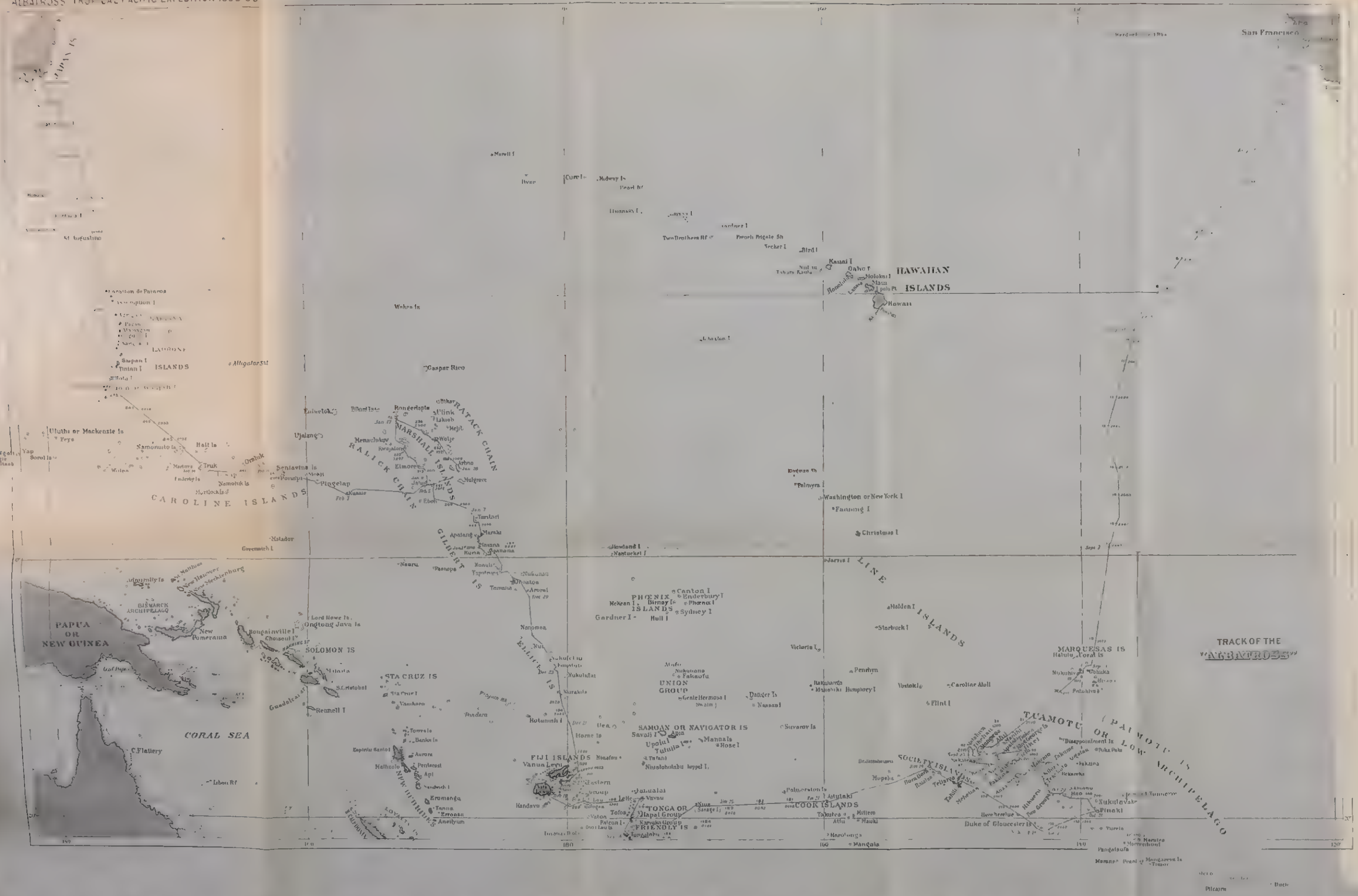
Hydrographic sketch of the Pacific, from the Gulf of California to Northern Ecuador, with the Track of the "Albatross," February 22 to April 23, 1891.



EXPLORATIONS OF THE
U.S. FISH COMMISSION
STEAMER ALBATROSS
Lieut Comdr Z.L. Tanner USN Comdg
February to April 1891
Compiled from the latest U.S. Hydrographic Office charts with additions by the U.S.F.C. Steamer Albatross
Soundings represented thus
100 fathom line shown thus
500
1000
1500
2000
GULF OF MEXICO
MEXICO
GUATEMALA
HONDURAS
SALVADOR
NICARAGUA
COSTA RICA
CARIBBEAN SEA
COLOMBIA
Gulf of Panama
Gulf of Fonseca
Panama
Tehuantepec
La Puerta
Salina Cruz
P. Angeles
ACAPULCO
Petatlan Bay
Maruata
Manzanillo
Banderas Bay
C. CORRIENTES
San Blas
MAZATLAN
Altata
Topolobampo
Agiabampo
GUAYMAS
C. SAN LUCAS
LA PAZ
REVILLA GIGEDO ISLANDS
GALAPAGOS ISLANDS
Albemarle I.
Narborough I.
Abingdon I.
Wenman I.
Culpepper I.
Tower I.
Chatham I.
Hood I.
Cocos I.
Malpelo I.
San Francisco
Path of the Albatross
100°
110°
90°
80°

PLATE 12.

Track of the "Albatross" from San Francisco to Yokohama, August, 1899, to March, 1900.


TRACK OF THE "ALBATROSS"
San Francisco
HAWAIIAN ISLANDS
Kauai I
Oahu I
Molokai I
Maui
Hawaii
Honolulu
Midway Is
Pearl Rf
Necker I
Bird I
French Frigate Sh
Two Brothers Rf
Marcus I
Wake Is
Johnston I
Gaspar Rico
LADRONE ISLANDS
Saipan I
Tinian I
Alligator Sh
St Augustino
Uluthi or Mackenzie Is
Yap
Hall Is
Namonuito Is
Truk
Mortlock Is
Ponape
Senlavine Is
Pingelap
Kusaie
CAROLINE ISLANDS
Eniwetok
Ujelang
Bikini
Rongelap
Utirik
Likieb
Mejit
Wotje
Menschikov
Kwajalong
Maloelap
Arhno
Majuro
Jaluit
Ebon
Milli
Mulgrave
RATACK CHAIN
RALICK CHAIN
MARSHALL ISLANDS
GILBERT IS
Taritari
Marakei
Apaiang
Tarawa
Apamama
Kuria
Nonuti
Tapitueo
Nukunau
Onoatoa
Arorai
Tamana
Nauru
Paanopa
Ocean I
Nanomea
Nui
ELLICE IS
Nukufetau
Funafuti
Nukulailai
Niutao
Rotumah I
Howland I
Baker I
PHŒNIX ISLANDS
Canton I
Enderbury I
Birnie Is
Phoenix I
Sydney I
Mckean I
Gardner I
Hull I
Atafu
Nukunono
Fakaofu
UNION GROUP
Swains I
SAMOAN OR NAVIGATOR IS
Savaii I
Apia
Upolu I
Tutuila I
Manua Is
Rose I
Niuafoou
Niuatobutabu
Keppel I
FIJI ISLANDS
Vanua Levu
Kandavu
Eastern Group
Lau Group
Vavau
TONGA OR HAPAI GROUP
FRIENDLY IS
Tongatabu
Savage I
Niue
COOK ISLANDS
Palmerston Is
Aitutaki
Rarotonga
Mangaia
Hervey Is
Danger Is
Nassau I
Suwarov Is
Penrhyn
Rakahanga
Manihiki
Humphrey I
Caroline Atoll
Flint I
Vostok
LINE ISLANDS
Palmyra
Washington or New York I
Fanning I
Christmas I
Jarvis I
Malden I
Starbuck I
Victoria I
MARQUESAS IS
Nukuhiva
Huahuka
Uapou
Hiva Oa
Fatuhiva
TUAMOTU (PAUMOTU IS OR LOW ARCHIPELAGO)
Disappointment Is
SOCIETY ISLANDS
Tahiti
Bellingshausen
Mopelia
Duke of Gloucester Is
Pitcairn
Mangareva Is
Nukutavake
Pinaki
Tureia
Hao
Makemo
Rangiroa
Anaa
Hikueru
PAPUA OR NEW GUINEA
BISMARCK ARCHIPELAGO
New Hanover
New Mecklenburg
New Pomerania
Admiralty Is
Bougainville I
Choiseul I
SOLOMON IS
Ongtong Java Is
Malaita
S. Cristobal
Guadalcanal
Rennell I
STA CRUZ IS
Vanikoro
Torres Is
Banks Is
Espiritu Santo I
Mallicolo
Aurora
Pentecost
Api
Sandwich I
Erromanga
Tanna
Aneityum
NEW HEBRIDES
LOYALTY IS
N. CALEDONIA
CORAL SEA
C. Flattery
180
160
140
120

Bulletin of the Museum of Comparative Zoölogy
AT HARVARD COLLEGE.
Vol. XLIII. No. 2.

REPORTS ON THE DREDGING OPERATIONS OFF THE WEST COAST OF CENTRAL AMERICA TO THE GALAPAGOS, TO THE WEST COAST OF MEXICO, AND IN THE GULF OF CALIFORNIA, IN CHARGE OF ALEXANDER AGASSIZ, CARRIED ON BY THE U. S. FISH COMMISSION STEAMER "ALBATROSS," DURING 1891, LIEUT. COMMANDER Z. L. TANNER, U. S. N., COMMANDING.

XXXIII.

STEIN-UND HYDRO-KORALLEN.

Von Emil von Marenzeller.

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With Three Plates.

CAMBRIDGE, MASS., U. S. A.:
PRINTED FOR THE MUSEUM.
August, 1904.

No. 2. — *Reports on the Dredging Operations off the West Coast of Central America to the Galapagos, to the West Coast of Mexico, and in the Gulf of California, in charge of* ALEXANDER AGASSIZ, *carried on by the U. S. Fish Commission Steamer "Albatross," during 1891*, LIEUT. COMMANDER Z. L. TANNER, U. S. N., *commanding.*

XXXIII.

Stein- und Hydro- Korallen. Von EMIL VON MARENZELLER.

DER Anteil der Stein- und Hydro-Korallen an der Illustrierung der von A. Agassiz bald nach der Albatross-Expedition 1891 veröffentlichten allgemeinen Skizze über den Charakter der Tiefseefauna des Panama Distriktes, deren Armut an Korallen als besonders bemerkenswert hervorgehoben wurde, beruht, was die einzelnen Arten betrifft, im Folgenden: die gesammte Ausbeute bestand aus 8 Arten Steinkorallen und 4 Arten Hydrokorallen. Eine Cladocora, welche Gattung eigentlich nicht zu den Tiefseekorallen gerechnet werden kann, aus Tiefen von 124 und 188 m., stellt die Beziehungen zur westindischen Korallenfauna dar. Ich war nicht imstande, sie von der im Antillenmeere verbreiteten Cladocora arbuscula zu unterscheiden. Bathyactis symmetrica (Pourt.) Mos., Madrepora (Amphihelia) oculata L., Desmophyllum crista galli E. H., Stenohelia profunda Mos., Cryptohelia pudica E. H., sind Kosmopoliten. Ein junges Flabellum ist vielleicht identisch mit F. patagonicum Mos. von Pinguin Island, Patagonien. Neue Arten sind: Caryophyllia diomedeae, Errina macrogastra, Stylaster divergens.

Eine Caryophyllia und eine Oculinide konnten wegen ihrer schlechten Beschaffenheit nicht näher bestimmt werden.

Nur von Cladocora arbuscula, Errina macrogastra, und Stenohelia profunda wurden zahlreiche Exemplare erbeutet.

Ausserdem wurden noch gesammelt: an der Kuste von Panama Coenopsammia tenuilamellosa E. H., Ulangia bradleyi Verrill, Astrangia haimei Verrill, und an der Duncan-Insel (Galapagos) zwei ausgelaugte Stücke eines Porites und einer Pocillopora, die wohl dieselben Arten sein durften, welche Graf Pourtalès unter den Korallen der Galapagos verzeichnete (Porites sp. und Pocillopora capitata Verrill).

MADREPORARIA.

Bathyactis symmetrica (Pourt.) Mos.

Die drei Exemplare von Stat. 3360, 3361 zeigen die Eigentümlichkeit, dass die Pseudotheka nicht flach ist, sondern leicht konvex. Die Rippen sind leicht vorspringend, die Synapticula wenig entwickelt und, weil die Kammern eng und zum Teil gedeckt sind, von oben nicht so sichtbar wie in den mehr offenen Kelchen mit flacher Pseudotheka. Die Septen 4. Ordnung verbinden sich auf weite Strecken mit den Septen 3. Ordnung.

Ein regenerierter Sektor von 6 mm. Durchmesser stammt von Stat. 3392.

Gefunden in Stat. 3360; 3° 9′ 0″ N. Br., 82° 8′ 0″ W. L.; Tiefe 3143 m. Stat. 3361; 6° 17′ 0″ N. Br., 83° 6′ 0″ W. L.; Tiefe 2765 m. Stat. 3376; 3° 9′ 0″ N. Br., 82° 8′ 0″ L.; Tiefe 2128 m. Stat. 3392; 7° 5′ 30″ N. Br., 79° 40′ 0″ W. L.; Tiefe 2387 m.

Cladocora arbuscula (Le Sueur) E. H.

Taf. 1, Fig. 1.

Koralle bis 80 mm. hoch, nur durch den Stammpolyp mit der Unterlage verbunden und bald von derselben abgelöst. Stammpolyp stets an totaler Länge alle Seitenäste weit überragend und in den meisten Fällen auch im Durchmesser. Knospung im Beginn sehr rege, später nachlassend. Am häufigsten zwei bis drei gleichaltrige Knospen, doch auch fünf. An den grossen Stöcken daher die letzten Knospen von dem Kelchrand des Stammpolypen und besonders von den Endkelchen der primären Aeste entfernter als von der unterhalb liegenden früheren Generation. Die Seitenaeste werden selten so lang wie der Stammpolyp oberhalb ihrer Ursprungsstelle und dann waren es immer der Zeit ihrer Entstehung nach frühe Knospen. Nur ausnahmsweise sind die Seitenäste so stark wie die Stammpolypen. Die Oberflache des Skelettes stets sehr deutlich fein granuliert. Die Rippen vorwiegend scharf ausgeprägt bis zum Kelchrande, in einzelnen Fällen zarter und dann an den jüngsten Teilen der Knospen kaum merklich. Septen nur in jungen Kelchen vollständig, in regelmässiger Folge. Durchmesser der Kelche der Stammpolypen bis 7 mm. In einem solchen waren bei spielsweise 46 Septen ausgebildet; es fehlten zwei Septen 4. Ordnung und ein Septum 3. Ordnung gliech den der 4. In Kelchen von 3 mm. Durchmesser waren 24 Septen regelmässig entwickelt und alle frei. Die Septen mit kräftigen, spitzen Granula besetzt, die im zentralen Teil der Septenränder grösser werden, zu kleinen Leisten sich vereinigen und dadurch auch die höchst inkonstante Form der nahe dem Zentrum sich entwickelnden Zahnchen (pali der Autoren), die man an allen Septen beobachtet, in dem

Masse als sie sich dem Zentrum nähern, beeinflussen. Die oft hin und her gebogenen an die Elemente der Kolumella mancher Caryophyllia erinnernden Zähnchen können mit ihren Nachbarn seitlich, nach oben und unten sich verbinden und bilden mit den gegenüberliegenden ein dichtes Flechtwerk von Trabekel, dem die Spitzchen im Zentrum des Kelchgrundes (Kolumella der Autoren) angehören. Längsschnitte zeigen die ausserordentliche Mächtigkeit dieser Pseudokolumella. Sie verhielt sich z. B. bei einem Durchmesser des Kelches von 5 mm. wie drei zu eins. Von den Granula der Septen geht auch die Verklebung der Enden der Septen letzter Ordnung mit dem der vorhergehenden aus, also Septen 4. Ordnung mit den der 3. in den grossen Kelchen, Septen 3. Ordnung mit den der 2. in den kleinen. Solche Septengruppen sind eine häufige aber nicht konstante Erscheinung (chevrons von Milne Edwards und Haime). Die Traversen sehr zart, meist weit auseinander liegend und spärlich. Dieses Verhalten hängt mit der geringen Breite der integren Septenflächen zusammen.

Unter den zahlreichen mir vorliegenden Exemplaren zeigen nur einige wenige (Fig. 1) den Habitus, welchen uns die schöne Abbildung in den "Florida reef corals" vorführt. Die meisten fallen dadurch auf, dass der Stammpolyp an Länge und Stärke die zahlreichen oft dichtgedrängten primären Aeste häufig weit übertrifft und dass hinter diesen wieder die secundären zurückbleiben. Es haben also die Korallen einen Habitus, den schon Graf Pourtalès beobachtete und zur Charakteristik einer eigenen Art, der Cladocora patriarca verwendete. Die Verkümmerung der Nebenäste lässt sich nicht auf Nahrungsmangel zurückführen, weil ja der Stammpolyp das grösste Wohlleben verrät und man es kaum ernstlich versuchen wird, diesen glücklichen Zustand durch seine besondere Geschicklichkeit, den übrigen Angehörigen der Kolonie die Nahrung abzufangen zu erklären und darin oder in einer vorteilhaft gesteigerten Ausnützung der Nahrung eine besondere Veranlagung erblicken wird. Es müssen andere Ursachen bei diesem Gegensatze zwischen Stammpolyp und Knospen im Wereke sein. Die vorliegenden Stöckchen zeigen alle den gleichen Aufbau. Die Knospung und das Wachstum der Aeste gehen derartig vor sich, dass es niemals zu einer Vergrösserung der Kolonie in die Breite kommt. Spuren der Verlötung von Aesten mit solchen benachbarter Kolonien sind nicht zu finden. In allen Fällen aber, wo eine Koralle nur auf die Verbindung des Stammpolypen mit der Unterfläche angewiesen ist, kann es leicht geschehen, dass der aufrechte Zustand frühzeitig unterbrochen wird, wenn aus physiologischen oder pathologischen Gründen die Brüchigkeit der untersten Partien gesteigert wird. Ich bin der Ansicht, dass alle diese Stöcke mit den hypertrophierten Stammpolypen nicht mehr festsassen, als sie gedredscht wurden. Es sind Stücke darunter, an welchen die Seitenäste in entgegengesetzter Richtung zu wachsen anfangen, was man nur als die Folge einer Lageveränderung deuten kann (Fig. 1 b, 1 c, 1 d, 1 e). Die Figuren 1 c, 1 d, 1 e geben die Koralle in umgekehrter Stellung. Bei 1 c. sitzt direkt der alten korrodierten

Bruchfläche ein kleines Vermetus-Gehäuse auf. Bei 1 d, haben sich die Vermetus in der Umgebung der Bruchfläche angesiedelt und gehen über diese hinaus. 1 e ist einem alten Fragmente derselben Art aufgewachsen. Ueber den früheren Zustand von 1, 1 a, 1 b, kann ich keine bestimmten. Angaben machen, da die Bruchflächen noch frisch waren, aber die Richtung des Seitenastes links unten bei 1 b lässt vermuten, dass auch dieser Stock ins Gedränge geriet. Am Boden liegend, auf und zwischen den Resten früherer Generationen seinesgleichen oder anderer Organismen wird der Stammpolyp vermöge seiner grösseren Länge und weil er auch von den der Unterlage zugekehrten Seitenästen gestützt wird unter viel günstigeren Bedingungen weiterwachsen können als die vorhandenen und noch ferner entstehenden Knospen. Man sieht hiemit, dass die Hypertrophie des Stammpolypen und das Zurückbleiben der Aeste in einer Weise erklart werden können, welche diese auffallende Erscheinung jeder Bedeutung als Speziesmerkmal entkleidet. Ausnahmsweise dürften einzelne Stöcke mit der Unterfläche verbunden bleiben und ungestört weiterwachsen, wenigstens bis zu dem Augenblicke, da sie in unsere Hände kamen. Das sind die in ihrem Habitus der typischen Cladocora arbuscula gleichenden (Fig. 1). Da auch ein anderes für C. patriarca angegebenenes Merkmal, die geringe Tiefeder Kelche, kaum von Belang ist, so halte ich die Charakteristik dieser Art für ungenügend. Und dieses Urteil dehne ich auch auf alle anderen neben der am längsten bekannten C. arbuscula aus dem Atlantischen Ozean beschriebenen Cladocoren aus. Sie müssen erst eine Prüfung bestehen, die bei einer von der Schablone unbeeinflussten, freieren Auffassung durchgeführt wird.

Auch für das Mittelmeer findet man Cladocora-Arten angegeben, die auf dem Niveau der Atlantischen stehen. Da jedoch das Material leicht zugänglich ist, so kann man sich bald überzeugen, dass von der hochgewachsenen C. cespitosa niedrigere Zwischenformen (wie C. stellaria E. H. und C. astraearia von v. Heider) und Zwergformen mit abnormer Verbindung der dichtgedrängten Kelche (C. astraearia Sars) abgetrennt wurden, in dem einen Falle also Bildungsexzess, in dem anderen Hemmungsbildung das Merkmal abgaben, dass ferner temporär schwankende Charaktere, wie die Zahl der Septen, deren Bezahnung (fälschlich pali genannt), die Beziehung (Verbindung) der Septen letzter Ordnung zu den der vorhergehenden u a zu einer unverdienten Bedeutung gelangten und dass nach diesen Mustern noch weitere "Arten" aufgestellt werden könnten. Die Cladocora cespitosa kommt auch frei ohne Spur der früheren Befestigung in Kugelform mit allseitig entwickelten Kelchen und sehr scharfer und regelmassiger Ausbildung der zentralen Septenzähne und der Spitzen der Pseudokolumella vor. Eine solche Form bildete schon Seba ab.

Die Rolle der C. cespitosa im Mittelmeere ubernimmt die C. arbuscula im Atlantischen Ozean, wo sie namentlich um die Antillen häufig als Strandform gefunden wurde und zur Aufstellung mehrer sogenannten Arten

Veranlassung gab. Nach Quelch kommt C. arbuscula auch am Kap der guten Hoffnung (nahe der Simonsbai; Challenger-Expedition) in Tiefen von 20–60 m. vor. Auf die von Milne Edwards und Haime für das Meer um Madeira angegebene C. debilis bezog Graf Pourtalès eine zwischen Florida und Kuba in Tiefen von 50 bis 125 m. gefundene Cladocora, wobei er die Bemerkung macht, dass diese Art möglicherweise nur eine Tiefseeform der C. arbuscula sei. Die C. patriarca genannte Form wurde in See vom Kap Frio, Brasilien in einer Tiefe von 70 m. erbeutet. In dem ungeheuren Gebiete zwischen dem Kap der guten Hoffnung und dem Fundorte der Cladocora des Albatross lebt nur eine einzige Art: Cladocora conferta Moseley (der Name ist bereits von Dana vergeben worden) an den Philippinen in Tiefen von 20 bis 60 m. Die Gattung Cladocora ist also artenarm. Sie ist keine Riffkoralle im gewöhnlichen Sinne des Wortes, da sie bis in Tiefen von 188 m. geht, aber auch keine eigentliche Tiefseekoralle. Ihr Vorkommen in den verschiedensten Zonen und ihre vertikale Verbreitung beweisen die Fähigkeit, sich in veränderte Verhältnisse zu finden, die allerdings mehr oder minder ihre Spuren hinterlassen.

Gefunden in Stat. 3367; 5° 31′ 30″ N. Br., 86° 52′ 30″ W. L.; Tiefe 188 m. Stat. 3368; 5° 32′ 45″ N. Br., 86° 54′ 30″ W. L.; Tiefe 124 m.

Oculinidarum gen.? sp.?

Es ist leider nur ein unregelmässiges, an der Oberfläche korrodiertes Bruchstück von 20 mm. Länge mit einem Durchmesser von 6 mm. an dem einem und von 9 mm. an dem anderen Ende vorhanden. Die Kelche sind gegenwärtig seicht; der grösste war oval und 3 mm. weit, andere waren rund und 2 mm. weit. Hie und da waren Rippen angedeutet. Um das Verhältnis dieser interessanten Koralle zu den bekannten Oculiniden zu charakterisieren, will ich bemerken, dass sie sich noch am meisten der von Alcock anfangs als ? Cyathohelia später als Sclerohelia formosa bezeichneten Art aus dem Indischen Ozean nähert.

Gefunden in Stat. 3401; 0° 59′ 0″ S. Br., 88° 58′ 30″ W. L.; Tiefe 712 m.

Madrepora (Amphihelia) oculata L.

Zwei kleine Zweige, die an die "Lophohelia candida Mos." aus dem Antillenmeere erinnern.

Gefunden in Stat. 3401 mit der vorigen.

Caryophyllia diomedeae, sp. nov.

Taf. 1, Fig. 2.

Kelch des einzigen Exemplares von seiner Unterlage abgebrochen, unten 5.5 mm. im Durchmesser, gegen den Rand allmählich erweitert, in der Richtung der kleinen Achse leicht gekrümmt, ungleich entwickelt (in der einen zur Seite der grossen Achse liegenden Hälfte höher und mit etwas breiteren Septen als in der anderen). Höhe des Kelches 13.5 und 15 mm. Oberfläche porzellanartig. Granulation verdeckt, nur auf den Rippen bemerkbar. Die Rippen in der Nähe des Kelchrandes durch tiefe Furchen abgesetzt. Die der 1., 2. und 3. Ordnung sind kantig und lassen sich, immer niedriger werdend, cc. 5 mm. nach abwärts verfolgen. Die Rippen 4. Ordnung sind nur in der Nähe des Kelchrandes gut ausgeprägt, aber fast zweimal so breit wie die der 3. Ordnung. Die Septen der 1. und 2. Ordnung gleich hoch, aber nur 1.5 mm. vorragend, unbedeutend höher als die Septen 3. Ordnung, welche wieder kaum die Septen 4. Ordnung überragen. Die Oeffnung des Kelches oval, 13 und 11 mm. im Durchmesser. Kelchhöhle wegen der niedrigen Septen und der hohen Septenlappen seicht. 48 Septen in vier Ordnungen, mit starken, spitzen Granula besetzt. Der obere Rand der Septen einen flachen Bogen bildend, der ziemlich unvermittelt in den senkrechten Innenrand übergeht. Die Septen erster und zweiter Ordnung egalisiert, ihr Innenrand leicht wellig. Zwölf Septenlappen, an den 12 Septen 3. Ordnung. Der dem Aussenrand der Septenlappen zugekehrte Innenrand der Septen 3. Ordnung in breite Falten gelegt. Die Septenlappen am äusseren und inneren Rande enger gefaltet und mit starken Granula besetzt, so hoch wie der senkrechte Innenrand der Septen 3. Ordnung. Der Spalt zwischen dem äusseren Rand der Septenlappen und dem Septum eng und überall gleichweit. Die Breite der Septenlappen ungleich; in der weniger entwickelten Hälfte des Kelches beträgt sie nicht ganz ein Drittel der Breite des zugehörigen Septums, in der anderen cc. die Hälfte. Die Septenlappen reichen mit zwei Drittel ihrer Breite weiter zentral als der Innenrand der Septen erster und zweiter Ordnung. Die Septen 4. Ordnung sind cc. zwei Drittel so breit wie die Septen 1. und 2. Ordnung und ihr Innenrand ist von dem Aussenrand der Septenlappen weniger weit entfernt als die Breite dieser beträgt. Die Kolumella hat eine Länge von 4 mm. und ist 2 mm. breit. Sie besteht aus zwei Reihen von je drei grobgefalteten Blättern.

Die der Caryophyllia diomedeae nahe stehende C. japonica Marenz. unterscheidet sich im Folgenden: die Septen ragen mehr vor. Die Septen 4. Ordnung sind nur halb so hoch wie die der dritten. Rippen fehlen. Der Kelch ist offener, weil die Innenränder der Septen nicht so senkrecht abfallen wie bei C. diomedeae. Die Septenlappen sind niedriger. Der Zwischenraum zwischen dem äusseren Rande der Septenlappen und dem korrespondierenden Innenrande der Septen 3. Ordnung ist oben weiter als in der Tiefe. Die Entfernung des Innenrandes der Septen 4. Ordnung von dem Aussenrande des Septenlappens ist mindestens ebenso gross oder grösser als die Breite des Septenlappens beträgt.

Gefunden in Stat. 3358; 6° 30′ 0″ N. Br., 81° 11′ 0″ W. L.; Tiefe 1043 m.

Caryophyllia sp.

Gefunden in Stat. 3370; 5° 36′ 40″ N. Br., 86° 56′ 50″ W. L.; Tiefe 252 m.

Flabellum sp.

Ein einziges unvollständiges Exemplar. Der Kelch ist gestielt, bis zum ausgebrochenen Rande 11 mm. hoch, 8 mm. im Durchmesser. Der 4 mm. hohe zylindrische Stiel hat unten einen Durchmesser von 2 mm. 48 Septen in vier Ordnungen. Zweifellos handelt es sich um einen Jugendzustand. In mancher Hinsicht wird man an die von Moseley im Challengerwerke abgebildeten jugendlichen Stadien von F. patagonicum erinnert. Nur ist bei diesen die Epithek mehr nach aussen geneigt. Man müsste annehmen, dass bei dem Flabellum des Albatross die Erweiterung des Kelches noch nachträglich eintritt. Dann wäre jedoch die Höhe des Kelches eine andere als die der abgebildeten Jugendformen des F. patagonicum.

Gefunden in Stat. 3370 mit der vorigen.

Desmophyllum crista galli E. H.

Das Exemplar von Stat. 3384 ist 43 mm. hoch, an der Basis 4 mm. breit. Die Mündung misst in der langen Achse 41 mm., in der kurzen 30 mm. Es stellt also die Varietät mit grosser Kelchmündung dar. Aehnliche nur noch grössere Individuen hat Moseley von der patagonischen Küste als D. ingens beschrieben. Ich habe mich bereits in meiner Arbeit über die Steinkorallen der "Valdivia" für die Identität dieser Desmophyllen mit D. crista galli ausgesprochen.

Gefunden in Stat. 3384; 7° 31′ 30″ N. Br., 79° 14′ 0″ W. L ; Tiefe 861 m.: und in Stat. 3401; 0° 59′ 0″ S. Br., 88° 58′ 30″ W. L.; Tiefe 742 m.

HYDROCORALLIA.

Errina macrogastra, sp. nov.

Taf. 2, Fig. 1, 1 a; Taf. 3, Fig. 1, 1 a.

Stock fächerförmig; es treten aber häufig einige Aeste aus der Ebene heraus. Verzweigung spärlich. Das Wachstum durch die Anwesenheit einer Polynoide beeinflusst: die Aeste erster und zweiter Ordnung verdickt, an ihrem Ende häufig nicht allmählich zugespitzt, sondern einen viel schmächtigeren, kurzen Ansatz tragend; secundäre seitliche Triebe oft vorhanden, aber klein bleibend. Oberfläche des Coenenchymes zwischen den bald offenen bald gedeckten, längsverlaufenden, parallelen Rinnen für die oberflächlichen grossen Maschen des Kanalsystemes quergerieft. Die Streifen selbst sind manchmal noch längsgeteilt. Eine Fläche des Stockes mit mehr Zooiden als die andere. Sie nehmen an den älteren Aesten eine terminale Zone von cc. 8 mm. Breite ein. Die Gastroporen zeigen keine besondere Anordnung. Die meisten finden sich an den Seitenflächen der Zweige ohne besondere Beziehungen zu den Dactyloporen. Sie haben an der Mündung einen Durchmesser von cc. 0.28 mm. und bleiben ohne auffallende Hervorwölbung oder Ausladung des Hinterrandes. Der Stylus gut sichtbar. Die Gastrozooide sehr lang, bis über 0.7 mm. Die Dactyloporenkappen nur an den jüngsten Stellen besser entwickelt, etwa 0.1 mm. vorspringend. Ihre Oeffnung ist nach hinten gerichtet, selten seitlich. Sie werden bald zu kleinen Erhebungen reduziert, in welchen eine 0.126–0.168 mm. lange und 0.042–0.056 mm. breite schlitzförmige Vertiefung liegt. Endlich verschwinden auch diese und man sieht nur die kleinen rundlichen Oeffnungen nackter Dactyloporen von 0.021, 0.028, 0.04 mm. Weite. Relativ selten sind solche junge Dactylozooide, die kappenlos bleiben, an den Orten reger Sprossung, so an den kleinen Seitenaesten oder den Astspitzen zu finden. Weibliche und männliche Stöcke sind vorhanden. Die weiblichen Ampullen (Fig. 1) sind cc. 0.77 mm. im Durchmesser und ragen cc. 0.56 mm. vor. Die männlichen (Fig. 1 a) sind kleiner flacher 0.42 mm. im Durchmesser, aber weniger isoliert als jene. Sie enthalten 3–4 Gonophoren.

Die Stöckchen sind klein. Der in Figur 1 bei zweimaliger Vergrösserung abgebildete war einer der ansehnlichsten. Die Farbe ist weiss.

Ich habe kürzlich meine Ansicht über das Verhältnis der Gattung Labiopora zu Errina geäussert und diese zwei Gattungen zusammengezogen (Resultats du voyage du S. Y. Belgica. Exped. antarctique Belge. Madreporaria et Hydrocorallia 1903). Indem ich die Labiopora moseleyi Ridley zu Errina zog, führte ich bereits eine Art mit nur wenig ausgebildeten Dactyloporenkappen ein und kann daher auch keinen Anstand nehmen, die eben beschriebene Hydrokoralle hinzuzufügen. Man wird wohl erst eine grössere Anzahl von Arten genauer ansehen müssen, um darüber Gewissheit zu erlangen, ob die eigentümliche Struktur der Coenenchym-Oberfläche, die bei der Untersuchung des Coenosarkes im Vergleich mit Errina gracilis und E. labiata sich ergebenden Unterschiede in den periferen Anteilen des Kanalsystemes, in der Grösse der Gastrozoen und der geringen Anzahl der kappenlosen Dactyloporen einen generischen Wert haben. Zu bedenken ist ferner, dass Errina macrogastra nicht unter normalen Verhältnissen zur Beobachtung kam. Meine Beschreibung bezieht sich nur auf einen durch die Lagisca irritans Marenz. erzeugten pathologischen Reizzustand, der sich nach den Veränderungen beurteilen lässt, welche die an demselben Fundorte vorkommende und von demselben Wurme heimgesuchte Stenohelia profunda Mos. erleidet (Taf. 2, Fig. 2, 2 a), deren unveränderter Zustand ja bekannt ist.

Die lokale Reaktion der Hydrokoralle auf den lästigen Besuch schafft diesem nur neue Vorteile. Sie führt zur Erzeugung eines Gehauses, das ihm Schutz und einen behaglichen Aufenthalt gewahrt. Es besteht aus einer dünnwandigen, hie und da durchbrochenen Auftreibung, welche oberhalb der Basis knapp unter der ersten Gabelung beginnt, sie einschliesst und häufig sich noch darüber hinaus erstreckt. Der Eingang ist weit, teils von ursprünglichen Flächen des Stockes, teils von unregelmässigen, von verschiedenen Seiten einander zustrebenden, grösseren oder kleineren, neugebildeten Kalklamellen umgeben, die in ähnlicher Weise verschmelzen würden wie dies anfänglich geschah. Der Wurm siedelt sich, wie wahrscheinlich, im jugendlichen Alter im Bereich der ersten Gabelung oder von Seitenästen unterhalb derselben, falls solche vorhanden sind, an. Er dürfte junge Stöckchen auswählen, weil er, je geringer der Durchmesser des Stämmchens ist, umso festeren Halt finden wird. Anfangs wird er es nur ringförmig umklammern, mit zunehmender Länge aber sich in einer Spirale herumwinden. Der beständige Reiz führt zunächst, wie ich mich überzeugte, zu einer Wucherung des Coenosarks und Ausscheidung von Kalklamellen zu beiden Seiten des Wurmkorpers in Gestalt von ziemlich aufrechten Wällen. Anfangs natürlich nur kurz, dehnen sich diese Neubildungen in dem Masse als der Wurm länger wird und vorrückt, weil ihm bei der gleichzeitigen Vergrösserung des Körpers in die Breite der Raum zu eng wird, immer mehr aus, während gleichzeitig die unvollkommene Zuwölbung stattfindet. Dem entsprechend findet man auch nach Entfernung der Wände des Gehäuses einen spiraligen Gang, dessen Spindel von dem Stamme der Hydrokoralle gebildet wird. Diese Spindel ist schmäler als der unterhalb liegende Teil des Hauptstammes und auch schwacher als die zwei ersten Gabeläste. Dies ist einerseits zurückzuführen auf eine Hypertrophie der genannten Teile des Skelettes mit gleichzeitiger Atrophie des Coenosarks und dadurch bedingten Stillstand im Dickenwachstum an allen von dem Wurme bedeckten Stellen, anderseits auf eine mechanische Usur, eine Art Ausschleifung bedingt durch die beständige Bewegung des Tieres. Da der Wurm eine spiralige Bahn um die Hydrokoralle beschreibt, ist es klar, dass die Mündung des Gehäuses inkonstant ist. Sie befindet sich je nach den Fortschritten des Baues auf der oberen oder unteren Fläche des Stockes oder in seitlicher Lage. Als Beweis für den Zustand des Ueberreizes, in dem sich das gesammte Coenosark befindet, können auch die zahlreichen gleichzeitig an weit von einander entfernten Punkten entstehenden Neubildungen dienen, die in dem Augenblicke als das Leben des Stockes unterbrochen wurde noch ohne Zusammenhang mit dem in das Geäste des Stockes vorrückenden Bau waren. In anderen Exemplaren, wo die Verbindungen dieser Einzelleistungen schon angebahnt aber noch nicht weit gediehen waren, kommt es derart zu mehreren Eingängen in das alte Gehäuse.

Gefunden in Stat. 3401; 1° 3′ 0″ S. Br., 89° 28′ 0″ W. L.; Tiefe 724 m.

Stylaster divergens, sp. nov.

Taf. 2, Fig. 3, Taf. 3, Fig. 2.

Die Zyklosysteme überall nur wenig vorspringend. Die zweizeilig alternierende Anordnung nur an den Spitzen der Aeste erkennbar (Taf. 3, Fig. 2), doch auch hier schon einzelne Zyklosysteme, die in einer zur ursprünglichen Anlage senkrechten Ebene sprossen. Solche Knospen entstehen ringsum, im späteren Alter sind sie aber zumeist auf eine Fläche beschränkt, die man als obere bezeichnen mag. Dieser entsprechend findet man auch zerstreute Zyklosysteme auf den stärkeren Aesten und dem Stamme, seltener auf der entgegengesetzten unteren Fläche; allein einzelne haben sich auch hier erhalten. Wegen des nicht vorwiegend seitlichen Ursprunges der Zyklosysteme und somit auch der Sprossen ist der Stock nicht fächer- sondern strauchförmig. Die Verzweigung ist spärlich, unregelmässig und sie geschieht nicht allseitig. Das Wachstum äussert sich mehr in einer Verstärkung als in einer Vermehrung der Aeste. Vereinzelt treten kleine frische Triebe auch noch auf der oberen Fläche der verdickten Aeste auf. Das Coenenchym wie bei anderen Arten mit feinen punktartigen Grübchen, die sich an den jüngsten Teilen des Stockes zu, der Länge nach oder bogig verlaufenden, durch kantige Grate von einander getrennten, Reihen anordnen (Taf. **3**, Fig. 2). Ein Stöckchen war ausnahmsweise am Hauptstamme und den älteren Zweigen mit spitzen Körnchen besetzt. Die Zyklosysteme klein, 0.7–0.85 mm. im Durchmesser, meist kreisrund, manchmal auch etwas oval. Pseudosepten 9, seltener 8, 10 oder 11, häufig ungleich dick, breit, das Lumen der Dactyloporen und des Gastroporus verengernd. Der Gastroporus tief, nicht so offen und trichterförmig wie bei anderen Arten; an der Mündung etwas weiter als die Breite eines Pseudoseptums beträgt, in der Höhe der Spitz des Stylus cc. 0168–0196 mm. im Durchmesser. Die Gastrozooiden mit 6 Tentakeln. Die Ampullen nehmen vorwiegend die obere und seitliche Fläche der stärkeren Aeste ein, erstrecken sich aber auch hie und da auf die Unterfläche. Weibliche Ampullen 0.5–0.7 mm. im Durchmesser, hemisphaerisch, zerstreut oder auch in kleinen Gruppen. Männliche Ampullen nicht so vorspringend, kleiner, bis 0.2–0.3 mm. im Durchmesser, ungleich in der Grösse, mit etwas höckeriger Oberfläche, gehäuft. Zwei bis drei Gonophoren.

Stöckchen bis höchstens 25 mm. hoch. Die Dicke des Hauptstammes an der Basis betrug in diesem Falle 9 mm. Ein anderes Exemplar war 20 mm. hoch, an der Basis 6.5 mm. stark und die Spitzen der äussersten Zweige standen 19 mm. von einander ab. Die Farbe der Stöckchen ist weiss.

Stylaster divergens gleicht im Habitus dem St. granulosus E. H., der wie die Verfasser der Histoire des Coralliaires bemerken, zu Allopora hinübergeführt. Milne Edwards und Haime behielten diese Gattung, welche Ehrenberg wohl nur deshalb aufstellte, weil er von der Existenz der Gattung Stylaster Gray keine Kenntnis hatte, mit der einzigen Art oculina bei, während Dana keinen Anlass fand, Allopora oculina von anderen verwandten Arten abzutrennen. Nur verstiess er gegen die Regeln der Prioritat, indem er zur Bezeichnung dieser Gruppe nicht den alteren Namen wahlte. Es scheint auch ihm Gray's Stylaster entgangen zu sein. Die Auffassung Dana's, dass Arten wie Stylaster roseus, infundibuliformis und Allopora oculina, die nach Sars mit Gunner's Madrepora norvegica identisch ist, zusammengehoren, fand jedoch bei dem dominierenden Einflusse der franzosichen Korallen-Monographie keine Anhanger. Nach und nach wurden in die Gattung Allopora Arten eingereiht, die ebenso gut bei Stylaster untergebracht werden konnten und andere, die nicht unwesentlich von der typischen Art abwichen. Die Umrisse dieser ungeformtem Allopora wurden von Saville Kent (Proc. Zool. Soc. 1871) angedeutet. Es scheint auch an den jüngsten Aesten die alternierende Knospung ganz zu fehlen und da der Stock überall dicht mit Zyklosystemen bedeckt ist, müssen zahlreiche Neubildungen an allen Stellen des Coenosarks oder auch Persistenz älterer Knospen angenommen werden. Der Habitus solcher Alloporen ist recht verschieden von den Stylaster-Arten, bei welchen gleichfalls zerstreute Zyklosysteme auf den Stämmen und Zweigen vorkommen.

Auch die Allopora profunda Moseley's würde ich ohne Bedenken zu Stylaster gestellt haben. Jedenfalls ist die anscheinend nur auf Grund der Untersuchung dieser einzigen Art gemachte neue Diagnose von Allopora nicht massgebend. Die Zahl der Tentakel der Gastroporen dürfte kaum ein brauchbares Gattungsmerkmal abgeben, da sie bei Stylaster schwankt: 8 bei St. densicaulis Mos., 6 bei St. divergens.

A. Agassiz hat in seinem vorläufigen Berichte über die Ergebnisse der Albatross-Expedition, 1891 (General Sketch of the Expedition of the "Albatross," from February to May, 1891. Bull. Mus. Comp. Zool., Vol. 23, 1892, p. 78) erwähnt, dass auf der von mir nunmehr beschriebenen Hydrokoralle eine Sigsbeia-Art lebe. Auch auf zwei der mir zur Verfügung stehenden Stöckchen sass noch die Ophiuride, deren Stamm und Aeste sie so fest mit ihren Armen umklammerte, dass eine Loslösung ohne Zertrümmerung des einen oder des anderen Objektes nicht möglich wäre. Ch. Lütken und Th. Mortensen, welche die Sigsbeia als neue Art, als S. lineata beschrieben, gaben eine Abbildung des Seesternes in situ (Reports on an Exploration off the West Coasts of Mexico, Central and South America, and off the Galapagos Islands, etc., 25. The Ophiuridae, Mem. Mus. Comp. Zool., Vol. 23, 1899, Taf. 20, Fig. 8). Dieses Vorkommen ist kein zufälliges, sondern erweist sich als eine konstante Symbiose, weil die typische Sigsbeia murrhina Lyman im Atlantischen Ozean unter denselben Verhältnissen auftritt. Die Hydrokoralle war Stylaster filogranus Pourt Wenn aber auch im Stillen wie im Atlantischen Ozean die Assosazion dieselbe blieb, hier wie dort eine Sigsbeia und ein Stylaster, so entsprechen doch nach unseren gegenwärtigen Kenntnissen die Glieder derselben einander nicht. Die Sigsbeia und der Stylaster des Stillen Ozeans erhielten andere Namen als die des Atlantischen. Doch ist vielleicht das letzte Wort nicht gesprochen. Die Beschreibung der typischen Sigsbeia murrhina beruht auf vier bei Havanna gefundenen Exemplaren. Von dieser sowohl wie von S. lineata ist so viel ich weiss nur je ein Fundort bekannt. Lütken und Mortensen heben ausdrücklich (l. c. p. 98) die nahe Verwandtschaft der Sigsbeis lineata und noch 6 anderer neuen Arten mit Atlantischen hervor und stellen damit einen Freibrief für Jene aus, welche die Vereinigung anstreben wollen. Für die Bestimmung des Stylaster freilich wäre noch wenig gewonnen, selbst wenn die Identität der Sigsbeia aus dem Stillen Ozean und der des Atlantischen sicher wäre, weil es gar nicht ausgemacht ist, dass die Ophiuride gerade nur des Stylaster filogranus zu ihrer Existenz bedarf und man erst Erfahrungen an anderen Stylaster-Arten machen müsste, dass solche Divergenzen im Habitus wie sie bei St. filogranus und divergens bestehen gegenstandslos seien.

Nach der Figur 13 auf Tafel 7 der Deep-sea-corals von Graf Pourtalès ist St. filogranus ein fächerförmiger, reichästiger Stock, an dem die gleichmässige Verschmächtigung der Seitensprossen und die gleichmässige Entwicklung der Zyklosysteme an diesen sowie an den Endspitzen hervorzuheben sind. Der Stock ist 120 mm. breit und 90 mm. hoch, der Stamm an der Basis 8 mm., nach der ersten Gablung 5 mm. breit. Die Zyklosysteme sind verhältnissmassig gross, grösser als bei St. divergens, an den Endaesten und den grösseren Aesten beiläufig um ihren Durchmesser von einander entfernt, aber an dem Hauptstamme sieht man keine. Dessenungeachtet kommen nach Graf Pourtalès einige wenige Aeste in abweichender Stellung vor. Die so regelmässige Entwicklung des abgebildeten Stockes bringt mich auf die Vermutung, dass er von dem Besuche der Sigsbeia verschont blieb. Bei Stylaster divergens dagegen muss man mit manchen Veränderungen rechnen, welche die Anwesenheit des Symbionten veranlasst haben dürfte. Hiezu ist man nach den anderweitig gemachten Erfahrungen berechtigt.

Gefunden in Stat. 3405; 0° 57′ 0″ N. Br., 89° 38′ 0″ W. L.; Tiefe 100 m. Mehrere Exemplare.

Stenohelia profunda Mos.

Taf. 2, Fig. 2.

Diese Art lebte in Gesellschaft von Errina macrogastra Marenz. und wird auch von demselben Wohnungsparasiten, Lagisca irritans Marenz. heimgesucht.

Die Veränderungen im Habitus sind hier sehr auffällige, weil das hypertrophische Coenenchym an den grösseren Aesten die Zwischenräume zwischen den Zyklosystemen ausfüllt, sodass sie in den plumpen Aesten wie eingebettet erscheinen, während die normalen Stöcke ihre elegante Gliederung, die auf der besonderen Art der Knospung der Zyklosysteme beruht, beibehalten. Man vermisst jene häufig selbst an den Spitzen der jüngsten Triebe. Auffallend ist die Verschmelzung mehrere Zyklosysteme wie dies in Figur 2 ersichtlich ist: an einem Zweige rechts oben sind zwei, an einem Zweige links oben sind drei miteinander verschmolzen. Es trat demnach Knospung wieder ein bevor eine frühere Knospe durch Wachstum genügend isoliert war, eine Erscheinung, die auf eine krankhaft gesteigerte Produktion zurückzuführen ist. Stenohelia profunda ist überhaupt sensibler und reagiert energischer als Errina macrogastra. Oft entstehen höchst überflüssige Neubildungen, die sich weit in das Geäste erstrecken und geräumige Arkaden mit allseitigen Zugängen zu dem geschlosseneren Bau schaffen.

Gefunden in Stat. 3404; 1° 3′ 0″ S. Br., 89° 28′ 0″ W. L.; Tiefe 724 m.

Cryptohelia pudica E. H.

Gefunden in Stat. 3358; 6° 30′ 0″ N. Br., 81° 44′ 0″ W. L.; Tiefe 1043 m.

ERKLAERUNG DER ABBILDUNGEN.

TAFEL 1.

Fig. 1. Cladocora arbuscula (Le Sueur) E. H. nat. Gr. regelmässig entwickeltes Exemplar, 1 c, 1 d, 1e, Stöckchen mit hypertrophierten Stammpolypen in umgekehrter Stellung.

Fig. 2. Caryophyllia diomedeae, sp. nov. nat. Gr.

Fig. 2 a. " " in Obensicht.

TAFEL 2.

Fig. 1. Errina macrogastra, sp. nov. ♀. 2 mal verg.

Fig. 1 a. " " ♂. "

Fig. 2. Stenohelia profunda Mos. ♀. 2 mal verg.

Fig. 3. Stylaster divergens, sp. nov. ♀. nat. Gr.

Fig. 3 a. " " ♀. 2 mal verg.

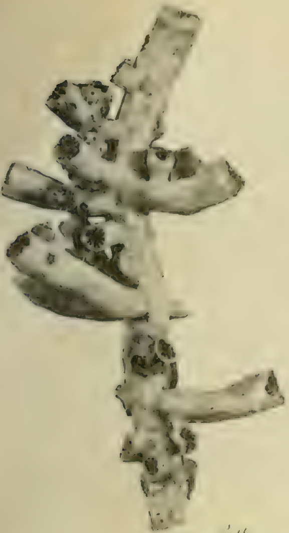
TAFEL 3.

Fig. 1. Ein Zweig von Errina macrogastra, sp. nov. 20 mal verg.

Fig. 1 a. Struktur der Coenenchymoberfläche der vorigen Art. 73 mal verg.

Fig. 2. Stylaster divergens, sp. nov. Astspitze. 25 mal verg.

1 a



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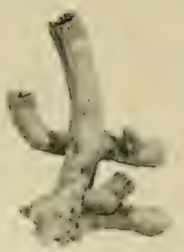

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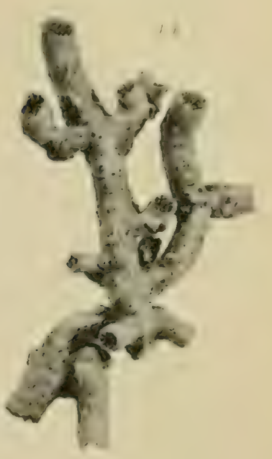

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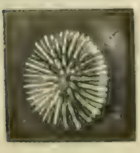

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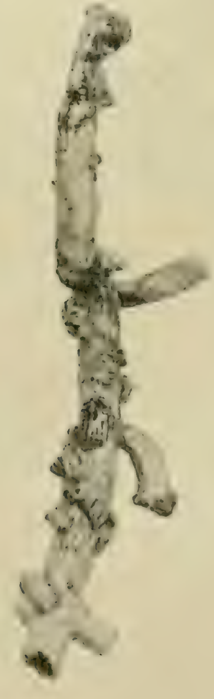

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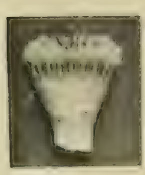

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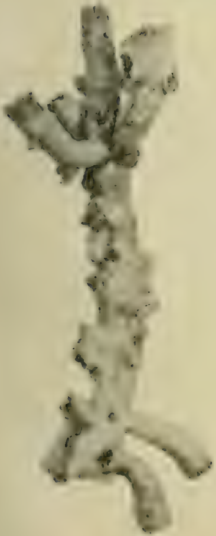
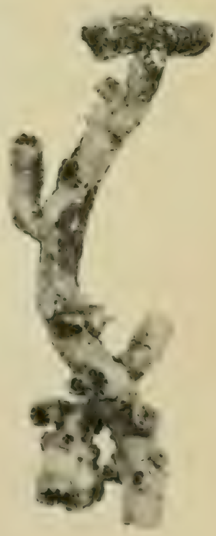
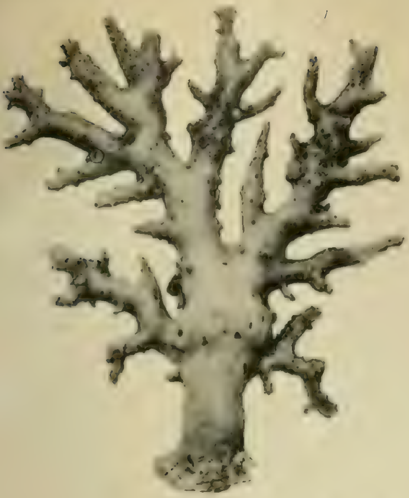
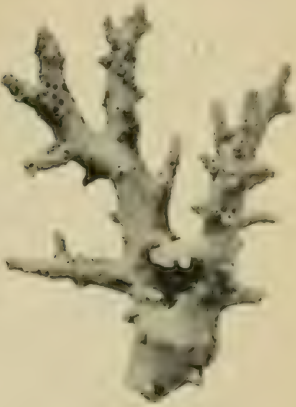
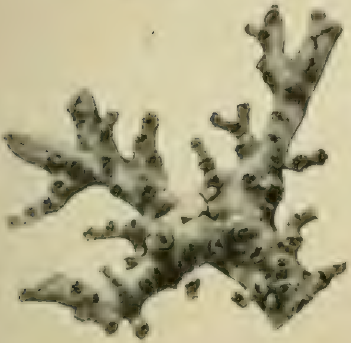


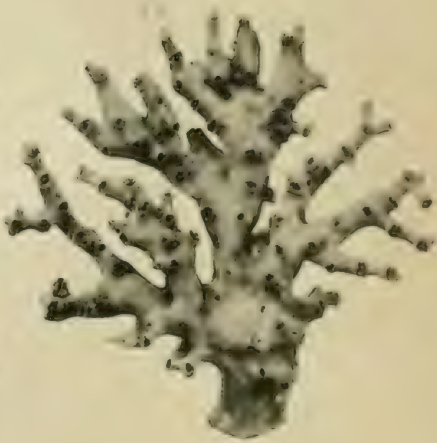
1 e

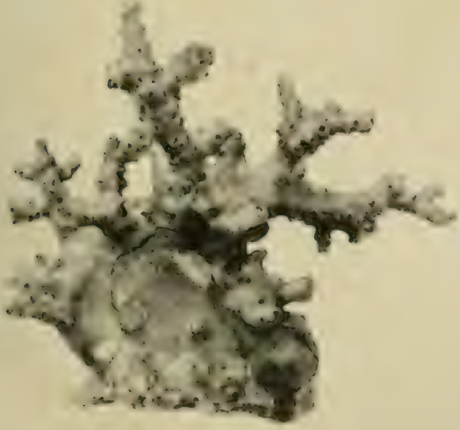


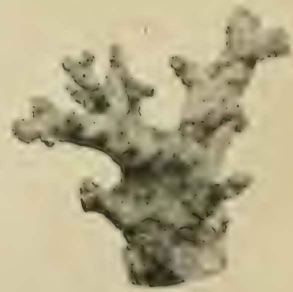












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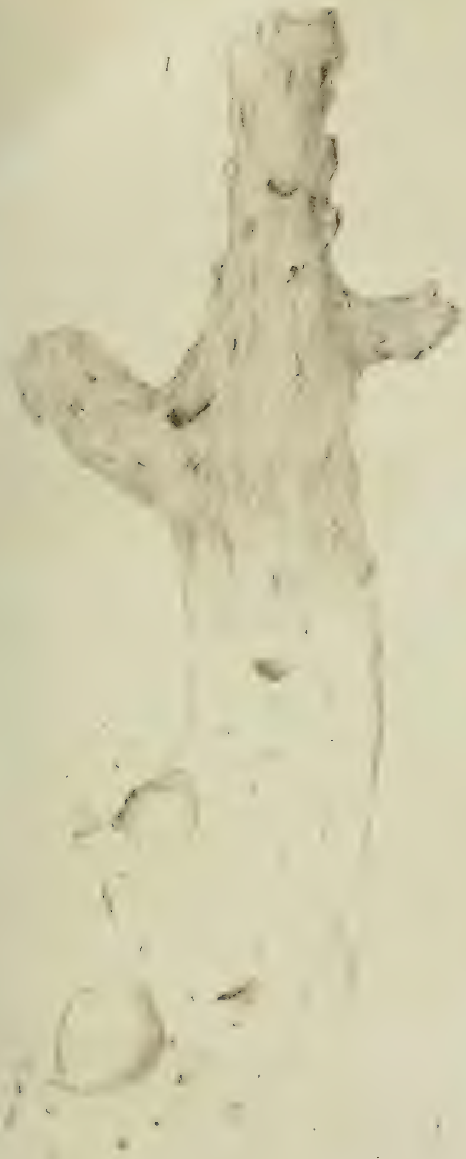

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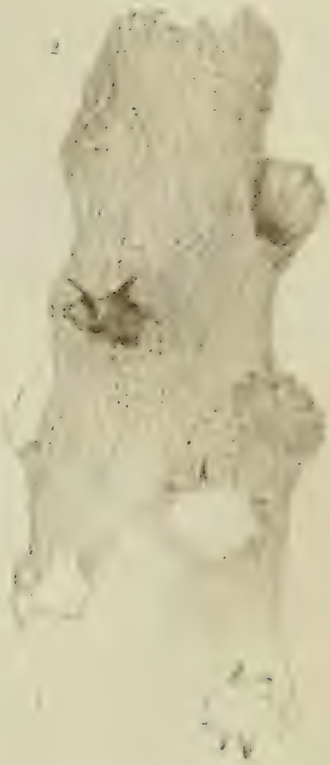

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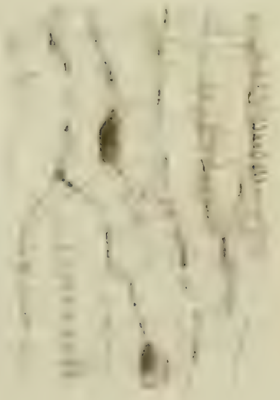

Lith. Anst. v. Th. Bannwarth, Wien.

Bulletin of the Museum of Comparative Zoölogy
AT HARVARD COLLEGE.
Vol. XLIII. No. 3.

REPORTS ON THE DREDGING OPERATIONS OFF THE WEST COAST OF CENTRAL AMERICA TO THE GALAPAGOS, TO THE WEST COAST OF MEXICO, AND IN THE GULF OF CALIFORNIA, IN CHARGE OF ALEXANDER AGASSIZ, CARRIED ON BY THE U. S. FISH COMMISSION STEAMER "ALBATROSS," DURING 1891, LIEUT. COMMANDER Z. L. TANNER, U. S. N., COMMANDING.

XXXIV.

LAGISCA IRRITANS, SP. NOV., EIN SYMBIONT VON HYDROKORALLEN.

Von Emil von Marenzeller.

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With One Plate.

CAMBRIDGE, MASS., U. S. A.:
PRINTED FOR THE MUSEUM.
August, 1904.

No. 3. — *Reports on the Dredging Operations off the West Coast of Central America to the Galapagos, to the West Coast of Mexico, and in the Gulf of California, in charge of* ALEXANDER AGASSIZ, *carried on by the U. S. Fish Commission Steamer "Albatross," during* 1891, LIEUT.-COMMANDER Z. L. TANNER, U. S. N., *commanding.*

XXXIV.

Lagisca irritans, sp. nov., ein Symbiont von Hydrokorallen. Von EMIL VON MARENZELLER.

WIEWOHL die eigentümlichen in Form eines Gehäuses auftretenden Neubildungen an Stylasteriden vielfach beobachtet und auch die Ursache derselben in der Anwesenheit eines Polychäten richtig erkannt wurden, so liegt doch bisher eine Bestimmung oder Beschreibung der betreffenden Würmer nicht vor. Fast in allen Fällen fand man eine Polynoine als Ansiedler, nur Studer sah in der Höhlung einer Cryptohelia pudica E. H. eine kleine Eunice. Da Euniciden (Eunice floridana Pourt., Eunice pennata Müll.) Symbionten von Steinkorallen (Lophohelia prolifera Pall., Madrepora (Amphihelia) oculata L.) sind, so mag jene Eunice kein zufälligen Gast gewesen sein. Die Polynoinen, welche sich mit Hydrokorallen vergesellschaften, werden sicher zahlreichen Arten angehören und es wird sich erst langsam herausstellen, ob sie ausschliesslich in Abhängigkeit von ihrem Wirte stehen oder auch unter gewöhnlichen Verhältnissen vorkommen.

Die auf Stenohelia profunda Mos. und Errina macrogastra, sp. n. in Station 3404 lebende Polynoine, welche ich nachstehend als neue Art beschreibe, ist eine typische Lagisca. Von Interesse ist der Schwund der gewöhnlich kräftigen Borstenbewaffnung.

Die Erscheinungen der Reaktion von Seite der Hydrokorallen habe ich in meiner Arbeit uber die Stein- und Hydro- Korallen der Albatross-Expedition 1891 (Diese Schriften, Vol. XLIII., pp. 75–87) beschrieben und abgebildet.

Lagisca irritans, sp. nov.

Körper 9–10 mm. lang, in der Mitte mit den Borsten 2.5 mm. breit, aus 41 bis 44 Segmenten zusammengesetzt, farblos. Die letzten 4 Segmente werden von den Elytren nicht bedeckt.

Kopflappen so lang wie breit, gewölbt, abgerundet hexagonal, durch eine seichte Längsfurche in zwei polsterförmige Hälften geteilt. Die Ecken der Vorderränder etwas vorspringend, chitinös, doppelrandig. Der Hinterrand in der Mitte etwas eingebuchtet. Die vorderen grösseren Augen halbseitenständig, rundlich oval, in Obensicht oval, mit ihrem hinteren Ende nicht ganz die halbe Länge des Kopflappens erreichend. Die kleineren hinteren Augen mehr dorsal liegend, rundlicher als die vorderen und um den Durchmesser dieser von ihnen entfernt. Das Pigment der Augen schwarz. Der unpaare Stirnfühler etwas mehr als dreimal so lang wie der Kopflappen, cylindrisch, im letzten Viertel allmählich verschmälert, ohne Papillen. Die paarigen Stirnfühler sehr kurz, kürzer als der Kopflappen, etwa ein Viertel so lang wie der unpaare Stirnfühler, kolbig, in ihrer äusseren Hälfte zugespitzt, ohne Papillen. Die Unterfühler an der Basis cylindrisch, dann mehr prismatisch, unten halb so breit wie der Kopflappen, drei bis viermal so breit wie der unpaare Stirnfühler, konisch zulaufend, vor dem Ende fein zugespitzt, ohne Papillen.

Der dorsale Fühlercirrus so lang wie der unpaare Stirnfühler, mit wenigen 0.024 mm. langen Papillen besetzt; der ventrale um ein Drittel kürzer, glatt. Im Träger des dorsalen Fühlercirrus eine starke, stumpfe Stützborste.

Das Buccalsegment von oben nicht sichtbar. Die Segmente in der Leibesmitte 0.25 mm. lang, ohne Ruder 1.8 mm. breit, also etwa siebenmal so breit wie lang.

Die Ruder (Fig. 1A) daselbst beiläufig so lang wie die Segmente breit sind. Der obere Ruderast in einen kurzen, das obere Ende des Vorderlappens des unteren Astes in einen längeren Fortsatz ausgehend.

Die Borsten des oberen Astes spärlich, meist acht bis neun, glatt, spitz (Fig. 1 Ba). Im unteren Aste 26–36, mit Ausnahme der vier untersten, am Ende zweizähnige Borsten. Die vier bis fünf obersten (Fig. 1 Bb) sind schlanker, namentlich dem Ende zu schmäler als die übrigen. Die Fig. 1 Bc stellt die Hauptform der Borsten aus der Mitte des Borstenbündels dar. Sie kommen auch mit längerem messerartigem Anteile und breiterem glattem Ende vor. Zu unterst ein Fächer von vier kleineren gekrümmten am Ende stumpfen Borsten (Fig. 1 Bd). Alle Borsten sind farblos und sehr durchsichtig. Die Dörnchenleisten sind äusserst schwach und fehlen beiläufig im letzten Drittel der Borste gänzlich. Am kräftigsten sind sie noch an den vier untersten Borsten (Fig. 1 Bd) ausgebildet. Hier erscheint auch der Rand in Seitenlage deutlich gezähnt, während er bei den beiden anderen Formen glatt oder mit kaum merklichen, feinen, in kurzen Zwischenräumen aufeinander folgenden Vorsprüngen versehen ist.

Die Elytren rundlich oval (Fig. 1 C), dünn, farblos, im durchfallende Lichte mit einer opakeren Randzone. Nur am äusseren und hinterem Rande wenige kleine Papillen. Die Elytren decken den Rücken.

Die Rückencirren sehr lang, selbst zweimal so lang wie das Borstenbündel des unteren Astes, etwas kürzer als der dorsale Fühlercirrus, wie dieser mit kleinen Papillen besetzt.

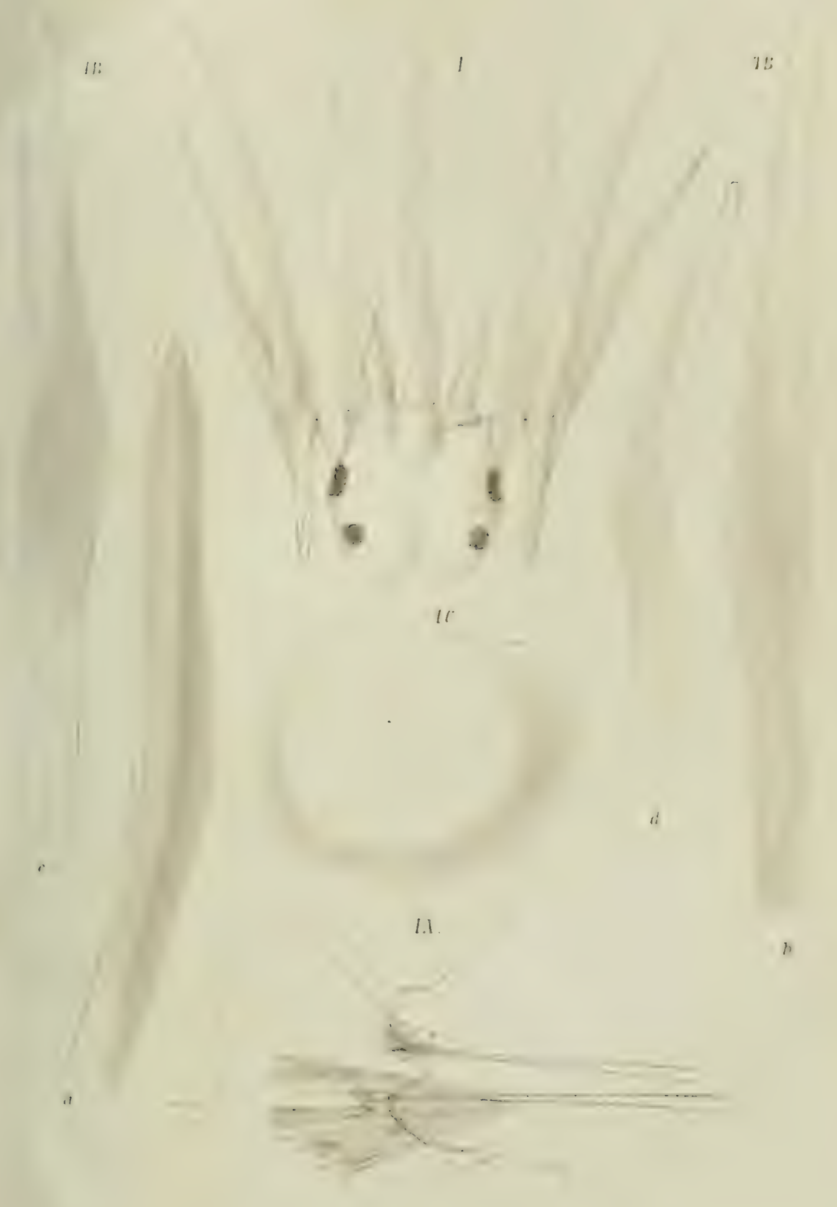
Die Bauchcirren glatt, nicht so weit vorragend wie der Fortsatz des unteren Ruderastes.

Nephridialpapillen sehr undeutlich, am sechsten Ruder beginnend. Gefunden in Stat. 3404; 1° 3′ 0″ S. Br., 89° 28′ 0″ W. L.; Tiefe 724 m.

ERKLAERUNG DER ABBILDUNGEN.

Fig. 1.	Lagisca irritans, sp. nov.	Kopflappen 30/1.
Fig. 1A.	“ “	Ruder von hinten 30/1.
Fig. 1 B.	“ “	Borsten. a, des oberen Astes; b, c, d, des unteren Astes, 600/1.
Fig. 1 C.	“ “	Zehnte linke Elytree 30/1.

LAGISCA IRRITANS MARENZ. TAF. I.


1B
1
1B
1C
c
d
1A
b
a

Bulletin of the Museum of Comparative Zoölogy
AT HARVARD COLLEGE.
VOL. XLIII. — NO. 4.

REPORTS ON THE RESULTS OF DREDGING, UNDER THE SUPERVISION OF ALEXANDER AGASSIZ, IN THE GULF OF MEXICO AND THE CARIBBEAN SEA, AND ON THE EAST COAST OF THE UNITED STATES, 1877 TO 1880, BY THE U. S. COAST SURVEY STEAMER "BLAKE," LIEUT. COMMANDER C. D. SIGSBEE, U. S. N., AND COMMANDER J. R. BARTLETT, U. S. N., COMMANDING.

XLII.

WESTINDISCHE POLYCHAETEN.

VON HERMANN AUGENER.

MIT ACHT TAFELN.

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CAMBRIDGE, MASS., U. S. A.:
PRINTED FOR THE MUSEUM.
MAY, 1906.

No. 4. — *Reports on the Results of Dredging, under the Supervision of* Alexander Agassiz, *in the Gulf of Mexico and the Caribbean Sea, and on the East Coast of the United States, 1877 to 1880, by the U. S. Coast Survey Steamer "Blake,"* Lieut. Commander C. D. Sigsbee, U. S. N., *and* Commander J. R. Bartlett, U. S. N., *Commanding.*

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XLII.

Westindische Polychaeten. Von Hermann Augener.

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Einleitung

Die Beschreibung der in den folgenden Zeilen aufgeführten Polychaeten und einiger Gephyreen kann als eine Ergänzung des Polychaetenwerkes über Anneliden des Floridagebietes von Ehlers "Florida-Anneliden" 1887 betrachtet werden und umfasst gegen 80 Arten. Die von mir beschriebenen Würmer entstammen einer Sammlung, welche unter der Leitung von Mr. A. Agassiz in den Jahren 1878, '79 und '80 im Gebiete der Antillen von dem coast-survey steamer "Blake" gemacht wurde. Der Umstand, dass die von mir untersuchte Annelidensammlung nicht seinerzeit in die "Florida-Anneliden" mit aufgenommen wurde, erklärt sich daraus, dass dieselbe erst lange nach Veröffentlichung der "Florida-Anneliden" an Herrn Professor Ehlers in Göttingen gelangte und mir von diesem mit Zustimmung von Mr. Agassiz zur Bearbeitung überlassen wurde.

Etwa der dritte Teil der aufgeführten Arten, welche sich auf 21

Familien verteilen, besteht aus Formen, welche in den "Florida-Anneliden" von Ehlers eingehend beschrieben worden sind, während die übrigen teils durch andere Autoren bekannt geworden sind, teils als neue Formen betrachtet wurden. Bezüglich der faunistischen Zusammensetzung der von mir untersuchten Würmercollection, in welcher sich die in den "Florida-Anneliden" schon hervorgehobene verschiedenartige Zusammensetzung der westindischen Wurmfauna ebenfalls ausspricht, ist zu bemerken, dass der grösste Teil der Arten aus westindischen oder doch mittelatlantischen Formen besteht; zugleich im Mittelmeer vorkommende Arten sind *Hermione kinbergi*, *Eunice floridana*, *Hyalinoecia tubicola*, *Thelepus cincinnatus*; Formen, die zugleich im mittel- und nordeuropäischen Gebiet und grösstenteils auch an der nordamerikanischen Ostküste vorkommen, sind *Euphrosyne armadillo*, *Aphrodite acuminata*, *Laetmatonice filicornis*, *Alentia gelatinosa*, *Antinoë finmarchica* (?), *Hyalinoecia tubicola*, *Onuphis eschrichti*, *Praxilla gracilis*, *P. praetermissa*, *Prionospio steenstrupi*, *Amphicteis gunneri*, *Thelepus cincinnatus*, *Terebellides strömi*. Es mag hier hervorgehoben sein, dass die zugleich an den mittel- und nordeuropäischen Küsten vorkommenden westindischen Formen sich garnicht oder so wenig von den nördlicheren Artgenossen unterscheiden, dass sie nicht als besondere Varietät aufgeführt wurden, auf die etwaigen Abweichungen ist jeweils in der Beschreibung hingewiesen worden.

Im westafrikanischen Gebiet ebenfalls vorkommende Arten sind *Hermodice carunculata*, *Chloeia euglochis*, *Chloënea atlantica*, *Hyalinoecia tubicola (= platybranchis* Gr.*)*, *Prionospio steenstrupi*. *Onuphis opalina* findet sich an der nordamerikanischen Ostküste ausser Westindien. *Admetella longipedata*, bisher vom "Challenger" nur südöstlich von Südafrika in einer Tiefe von 1375 fms gefunden, kommt in Westindien in geringerer Tiefe vor.

Von den wenigen aufgeführten Gephyreen erreicht *Phascolion strombi* in Westindien vielleicht seine südlichste Verbreitung, während das nordische *Phascolion pallidum*, wenn meine Auffassung der in Frage kommenden Würmer richtig ist, als Varietät in Westindien verkommt. *Sipunculus robustus* ist zugleich indo-pacifisch weit verbreitet, *Bonellia minor* findet sich im Mittelmeer und in Japan. Der Beschreibung der Arten lasse ich eine Aufzählung derselben in der gleichen Reihenfolge voraufgehen, in welcher für jede Form die geringste und grösste Tiefe, in der sie gefunden wurde, angegeben wird, namentlich zum Vergleich mit den "Florida-Anneliden" von Ehlers. Die in den "Florida-Anneliden" nicht vertretenen Familien, die Hermellidae und Spionidae, die hier aufzuführen sind, sind inzwischen durch andere Autoren wie Treadwell (Polychaetous Annelids of Porto Rico, 1902) aus Westindien bekannt geworden.

Ich erlaube mir an dieser Stelle Herrn A. Agassiz für die Überlassung des von mir untersuchten Polychaetenmaterials wie die Drucklegung der Arbeit meinen verbindlichen Dank auszusprechen; meinem hochverehrten Lehrer Herrn Professor Ehlers in Göttingen bin ich zu grossem Dank verpflichtet für seinen wertvollen Rat bei der Einführung in das Gebiet der Polychaeten.

Verzeichniss der Arten nebst Angabe der geringsten und grössten Tiefe ihres Vorkommens.

NAME.	TIEFE IN FMS.		NAME.	TIEFE IN FMS.	
	Geringste	Grösste		Geringste	Grösste
Euphrosyne armadillo	164	164	(Onuphis gracilis) = Hyal. tubicola juv.	464	576
Hermodice carunculata	24	115	Onuphis opalina . . .	197	980
Chloeia euglochis . .	82	—	O. rubrescens	114	250
Chloënea atlantica . .	175	288	O. eschrichti	306	464
Aphrodite acuminata .	65	263	Diopatra pourtalèsi .	95	502½
Hermione kinbergi . .	115	115	D. glutinatrix . . .	164	1200
Laetmat. filicornis . .	44	306	D. spiribranchis . . .	87	87
Laetmat. nuchipapillata	573	573	Lumbriconereis robusta	71	980
Pontogenia maggiae .	120	120	Nereis versipedata . .	27	115
Leanira simplex . . .	129	129	N. rigida	138	138
Sthenelais spec. . . .	603	603	N. bicruciata	115	115
S. gracilior	7½, 50	7½, 50	N. articulata	124	124
Psammolyce floccifera	7½, 50	391	Nephthys phyllocirra .	44	197
Lepidonotus citrifrons .	73	123	Branchiosyllis oculata .	7½, 50	7½, 50
L. lacteus	62	298	Castalia hesionoides .	164	399
Halosydna fuscomarmorata	?	?	Glycera oxycephala .	94	611
Polynoëlla pachylepis .	306	461	Goniada emerita var. quinquelabiata . .	466	466
Alentia gelatinosa . .	123	123	Stylarioides collarifer .	159	370
Admetella longipedata	291	291	Oncoscolex (Eumenia) heterochaetus . .	424	785
Lagisca floccosa var. unidentata . . .	24	24	Clymene cirrata . . .	137	395
Antinoë finmarchica .	461	461	Praxilla gracilis . . .	197	197
Nemidia antillicola .	304	980	P. praetermissa . . .	464	464
Eulepis splendida . .	170	170	Maldane cuculligera .	129	740
Eunice violaceo-maculata	115	115	M. collariceps . . .	169	395
E. tibiana	127	250, 400	Sabellaria asteriformis	103	103
E. floridana	150	399	S. tenera	200	200
E. articulata	306	464	Aricidea alata . . .	60, 150	60, 150
E. antillensis	94	116	Prionospio steenstrupi	159	159
E. binominata . . .	69	115	Amage tumida . . .	71	60, 150
E. collini	288	298	Ampharete spec. . .	263	263
Hyalinoecia tubicola .	87	2993	Amphicteis procera .	291	291
			A. gunneri	116	250

Name.	Tiefe in fms.		Name.	Tiefe in fms.	
	Geringste	Grösste		Geringste	Grösste
Melinna spec.	994	994	V. annulituba	210	210
M. monocera	116	170	Protula submedia	127	248
M. profunda	1507	1507	Sternaspis fossor	?	?
Terebellides stroemi	180	576	Bonellia minor	103	257
Thelepus cincinnatus	229	257	Sipunculus robustus	576	576
Potamis spathifera	127	980	Phascolion strombi.	277	476
Serpula spec.	69	69	P. pallidum var. meridionale	103	103
Vermilia annulata	103	164			

AMPHINOMIDAE.

Euphrosyne armadillo M. Sars.

Ein einziges ganzes Exemplar einer Euphrosyne von ca. 0,7 cm. Länge mit 23 Segmenten und von gelblich grauer schwach irisierender Färbung ist nach der Zahl und Form der Kiemen (es sind jederseits 5 Kiemen vorhanden) wohl hierher zu stellen. Die Borsten sind ein wenig anders gestaltet als sie von McIntosh[1] abgebildet sind, und ähneln mehr denen der *Euphrosyne borealis* Oerst. Die gesägten Borsten sind an der Gabelungsstelle in die beiden Zinken auf der Seite der längeren Zinke etwas convex, und die längere Zinke ist etwa in ihrer unteren Hälfte auf der Innenkante schwach convex gebogen. Die stärkeren glatten Borsten haben eine etwa ¼ der Länge der längeren Zinke betragende kürzere Zinke, während die längere Zinke etwa in ihren terminalen ⅔ ganz schwach convex an der Innenkante gebogen ist.

Die glatten Borsten des unmittelbar über dem Ventralcirrus stehenden Bündels sind schlanker und zarter als die dorsalen glatten Borsten; an den oberen längeren Borsten dieses Bündels ist die längere Zinke länger entwickelt als an den unteren Borsten desselben und an der Spitze ein wenig hakig gekrümmt.

Auf Grund der ein wenig anders gestalteten Borsten möchte ich das vorliegende Tier als eine südliche Abänderung der nord- und mitteleuropäischen Euphrosyne armadillo ansehen.

Fundort:
Nr. 218. Depth 164 fms.
Lat. Sta. Lucia N.
Long. " W.

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[1] McIntosh, Monogr. British Annelids, 1900, part 2, p. 238, pl. 35.

Hermodice caruncúlata Pallas (Kinberg).

Die Art ist durch eine grössere Anzahl von Exemplaren vertreten.

Fundort:

Nr. 132. Depth 115 fms.
Lat. Sta. Cruz N.
Long. " W.

Nr. 142. Depth 27 fms.
Lat. Hannegan Passage N.
Long. " " W.

Nr. 152. Depth 24 fms.
Lat. Hannegan Passage N.
Long. " " W.

Chloeia euglochis Ehlers.

Von dieser Art finden sich zwei vollständige Exemplare vor mit 27 und 32 Segmenten, von denen das Grössere incl. der hinten überstehenden Borsten ca. 5 cm. lang ist. Das kleinere Exemplar trägt noch die Zeichnung, wie sie von Ehlers abgebildet wurde,[1] allerdings ohne den schönen violetten Schimmer und die farbigen Binden der Borsten.

An einzelnen der ventralen Borsten fehlt die kürzere Zinke, ist hier aber allem Anschein nach nur durch Abbrechen verloren gegangen. (*Loc. cit.*, p. 20, Taf. **2**, Fig. 5.)

Vereinzelt zeigen die Kiemen ein von ihrem gewöhnlichen Bau etwas abweichendes Verhalten, indem statt einer Hauptachse an ihnen mehrere verschieden lange Hauptachsen nebeneinander bestehen können, die ihrerseits erst wieder die primären Nebenachsen mit den Kiemenblättchen tragen.

Fundort:

Nr. ? . Jan. 27, Depth ? fms.
Lat. Dominica N.
Long. " W.

Nr. 293. Depth 82 fms.
Lat. Barbados N.
Long. " W.

Chloënea atlantica McIntosh.

Taf. **1**, Fig. 1.
Challenger Reports, 1885, vol. 12. Annelida, p. 15.

Diese von der Challengerexpedition südlich von den Canarischen Inseln gesammelte Form liegt mir in zwei Exemplaren vor, von denen das Grössere bei vollständiger Erhaltung 20 Segmente enthält, mit den hinten überstehenden Borsten etwa 1,2 cm. lang ist und eine grösste Körperbreite von 0,4 cm. hat. Das kleinere Exemplar enthält 16 Segmente. Die Färbung der Tiere ist graugelblich, bei dem grösseren

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[1] Ehlers, Florida-Anneliden, 1887, p. 18, Taf. **1**.

Exemplar auf der Rückenfläche trübe violettrötlich. Der Beschreibung von McIntosh lässt sich Einiges ergänzend hinzufügen.

Die Karunkel reicht nach hinten bis ans 5te oder bis zur Mitte des 5ten Segmentes. Der unpaare Kopffühler erreicht etwa ¼ der Länge der Karunkel; die inneren paarigen Fühler sind kurz, kaum länger als der Kopflappen breit, an ihrer Basis nur wenig getrennt und ragen kaum über den Vorderrand des Praeoralpolsters hervor. Die äusseren paarigen Fühler sind 2- bis 3mal länger als die inneren paarigen. Das braune Praeoralpolster ist im Umriss gestreckt oval, und etwa 1½mal länger als breit. Die Mundöffnung wird hinten begrenzt durch einen am Vorderrande eingekerbten Fortsatz des dritten Segmentes von halber Segmentlänge und etwa ⅓ Segmentbreite.

Augen habe ich auch an den vorliegenden Tieren nicht entdecken können; während der Kopflappen des einen Tieres dunkel gefärbt war, trug er bei dem anderen Tier auf hellem Grunde jederseits einen grossen vorderen und einen hinteren kleineren, mehr seitwärts gerückten dunkelfarbigen Pigmentfleck, und ausserdem einen medianen dreieckigen Pigmentfleck zwischen den vorderen seitlichen Flecken.

Von den beiden Dorsalcirren, welche rot gefärbt sind, erreicht der hintere längere nicht die Länge des dorsalen Borstenbündels. Wo die Kiemen, von denen sicherlich eine Anzahl abgefallen war, beginnen, war nicht zu entscheiden, sie waren von der Körpermitte an etwa vorhanden, die Form der Kiemen mag als handförmig (Taf. 1, Fig. 1) bezeichnet werden; die Kiemen entspringen hart vor der hinteren Grenze der Segmente unmittelbar hinter und am dorsalen Borstenbündel und greifen nur wenig auf das folgende Segment über.

Was die Borsten betrifft, so zeigen die gesägt-zinkigen Borsten eine weniger scharfe Zähnelung als bei der Challengerform, am deutlichsten noch an den Borsten der drei ersten Segmente, welche nur gesägte Borsten enthalten.

Das Körperende der Tiere trägt 2 cylindrische, dicke am Ende abgestumpfte Analcirren von der Länge der zwei letzten Segmente.

Wie *Chloënea atlantica* im Allgemeinen in ihrem Habitus mit der Gattung Notopygos Grube grosse Ähnlichkeit hat, so spricht sich diese auch in der Gestaltung der Dorsalfläche der Chloënea aus.

Die Rückenfläche der Tiere zeigt an der Grenze zwischen zwei Segmenten eine mittlere, quer rautenförmige oder ovale vertiefte Partie, welche vorn und hinten durch Falten begrenzt wird. Das Sichtbarsein dieser rautenförmigen Gruben, welche je dem auf sie folgenden Segment anzugehören scheinen (?), steht offenbar im Zusammenhang mit einer geringen Einkrümmung der vorliegenden Tiere gegen die Bauchseite, welche mit einer stärkeren convexen Wölbung der Rückenseite correspondirt.

Die westindischen Tiere stammen aus einer viel geringeren Tiefe als die Challengerexemplare (1525 Faden).

Fundort:

Nr. 281. Depth 288 fms.
Lat. Barbados N.
Long. " W.

Nr. 101. Depth $\frac{175}{250}$ fms.
Lat. Off Morro Light N.
Long. " " W.

APHRODITIDAE.

Aphrodite acuminata Ehlers.

Von dieser Art finden sich drei Exemplare in der Collection vor, welche der Beschreibung dieser Art von Ehlers[1] im Ganzen entsprechen. Es lässt sich der Beschreibung dieser Art noch Weniges hinzufügen. Was den Kopflappen anbetrifft, so finden sich bei *Aphrodite acuminata*, welche überhaupt der *Aphrodite aculeata* sehr ähnlich ist, ebensowenig Augenstiele wie bei der letzteren Art; die Augen liegen wie bei der europäischen Art auf ovalen Polstern auf der Dorsalfläche des Kopflappens. Der unpaare Fühler des Kopflappens ist höchst wahrscheinlich 3-gliederig wie bei *Aphrodite aculeata*, indem sich bei einem der vorliegenden Tiere an dem Basalstumpf des Tentakels das zweite, cylindrisch-birnförmige Fühlerglied noch erhalten vorfand.

Über die Borsten ist noch zu bemerken, dass die starken braunen dorsalen Borstenspiesse an allen Segmenten vorkommen; an den Haaren des Borstenfilzes konnte ich keine Nebenhärchen entdecken, und alle scheinbar solche darstellende Gebilde sind wohl nur auf anhaftende Fremdkörper oder Zerreissungen der Filzhaare zurückzuführen. Die characteristische Bärtelung der starken unteren Ventralborsten kann durch Abnutzung teilweise oder ganz verschwinden.

Fundort:

Nr. 332. Depth 263 fms.
Lat. 35° 45′ 30″ N.
Long. 74° 48′ W.

Nr. 334. Depth 129 fms.
Lat. 40° 01′ N.
Long. 70° 58′ W.

Nr. 332. Depth 65 fms.
Lat. 35° 45′ 25″ N.
Long. 74° 50′ 30″ W.

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[1] Ehlers, Florida-Anneliden, 1887, p. 39, Taf. 5.

Hermione kinbergi Quatrefages.

Hermione hystricella Quatrefages (?).
Kinberg, Fregatten Eugenies Resa, 1857, p. 5, Taf. 2.

Eine kleine Hermione von ca. 1 cm. Länge und mit etwa 30 Segmenten scheint mir so sehr mit dieser zuerst von Quatrefages[1] aus dem Mittelmeer beschriebenen Art übereinzustimmen, dass ich sie unter deren Namen aufführe. Die Abbildungen, welche Kinberg (*loc. cit.*) von dieser Art unter dem Namen *Hermione hystricella* Quatrefages gegeben hat, lassen sich gut auf das vorliegende westindische Exemplar beziehen.

Einige kleine Abweichungen, welche aber wohl kaum spezifischen Wert haben, sind hier zu erwähnen. Bei dem vorliegenden Tier scheinen die Elytren etwas breiter und am freien Rande etwas mehr abgerundet zu sein, und deren Oberflächenpapillen wenigstens zum Teil ziemlich viel grösser und auch dichter gestellt zu sein als in der Abbildung Kinberg's (*loc. cit.*, Taf. 2, Fig. 5); letztere entspricht etwa der Oberfläche des medianwärts gerichteten hinteren Teils der Elytren.

Die Borsten stimmen im Allgemeinen durchaus mit denen des Quatrefages'schen Exemplars überein, vielleicht verhalten sich aber bei dem amerikanischen Tier ein Teil der starken dorsalen braunen Borsten, welche median- und hinterwärts gerichtet sind, etwas anders und scheinen wenigstens in der hinteren Körperhälfte von ungewöhnlicher Länge zu sein; von den fraglichen, fast sämtlich abgebrochenen Borsten fand sich noch eine vor, welche noch vor der halben Körperlänge entspringend, das hintere Körperende des Tieres überragte (vergl. hierzu *loc. cit.* Kinberg's Abbildung des Tieres). Von den spärlichen noch vorhandenen Cirren trug ein Dorsalcirrus unter dem deutlich abgegliederten langkeulenförmigen Endglied am Ende seines proximalen Abschnittes einen dunklen Pigmentring.

Die Rückenseite des Tieres war, wie das bei *Hermione hystrix* vorkommt, mit einem Überzuge aus Sandkörnchen und anderen Fremdkörpern teilweise bedeckt; ein Borstenfilz konnte nicht auf der Rückseite bemerkt werden. Von *Hermione hystrix* ist *Hermione kinbergi*, wie Quatrefages ebenfalls meint, als Art wohl sicher zu trennen.

Fundort:
No. 132, Depth 115 fms.
Lat. Sta. Cruz N.
Long. " W.

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[1] Quatrefages, Histoire naturelle des Annelés, 1865, p. 209.

Laetmatonice filicornis Kinberg.

Laetmatonice kinbergi Baird.
Ehlers, Florida-Anneliden, 1887, p. 44, Taf. **7**, **8**.

Eine Reihe von Exemplaren dieser Art liegt vor, welche bis auf die Elytrenstellung ganz mit der Beschreibung von Ehlers[1] übereinstimmen. Das Längenverhältnis des unpaaren Fühlers und der Palpen war bei einer grösseren Zahl von Tieren so, dass der Fühler reichlich halb so lang wie die Palpen war, die letzteren $\frac{1}{3}$ bis $\frac{1}{2}$ so lang wie der Körper der Tiere waren.

In der Beschreibung von Ehlers (*loc. cit.*) ist irrtümlicher Weise für *L. kinbergi* die Verteilung der Elytren als 2, 4, 5, 7 . . . 23, 26, 29 dargestellt worden; bei den Exemplaren, welche der Beschreibung von Ehlers zu Grunde lagen wie bei den mir vorliegenden Tieren ist aber die Stellung der Elytren folgendermassen: 2, 4, 5, 7 . . . 23, 25, 28, 31, also genau so wie sie von Buchanan[2] für *L. filicornis* und *L. kinbergi* aus dem British Museum beschreiben wird.

Es scheint mir nunmehr angebracht auf Grund der Untersuchungen von Buchanan (*loc. cit.*) auch die *Laetmatonice kinbergi* Baird (Ehlers), aus dem Floridagebiet mit der *Laetmatonice filicornis* Kinberg zu vereinigen. Bei der Annahme, dass das Fehlen des starken Dornes an den Ventralborsten bei einem Teil der britischen von Buchanan untersuchten Exemplare von Laetmatonice wie bei dem Kinberg'schen Originalexemplar[3] in der natürlichen Beschaffenheit der Borsten begründet ist und nicht auf Verlust desselben beruht, würde *Laetmatonice kinbergi* Baird (Ehlers) aus dem Floridagebiet meines Erachtens höchstens als Varietät der nördlichen Stammform *Laetmatonice filicornis* Kinberg anzusehen sein, da das Längenverhältnis des Fühlers bei dem der Abbildung Kinberg's (*loc. cit.*) zu Grunde gelegten Originalexemplar der *Laetmatonice filicornis* wahrscheinlich nur einen exceptionellen, individuellen Fall repraesentirt.

Fundort:

Nr. 309.	Depth 304 fms.	Nr. 316.	Depth 229 fms.
	Lat. 40° 11′ 40″ N.		Lat. 32° 7′ N.
	Long. 68° 22′ W.		Long. 38° 37′ 30″ W.

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[1] Ehlers, Florida-Anneliden, 1887, p. 44, Taf. **7**, **8**.

[2] Buchanan, Report on Polychaeta collected during the Royal Dublin Society's survey. Part I., Deep-water forms. London, 1893, p. 170, Plate **9**.

[3] Kinberg, Fregatten Eugenies Resa, 1857, p. 7, Pl. **3**.

Nr. 332.	Depth 263 fms.	Lat. 35° 45′ 30″ N.	Long. 74° 48′ W.
Nr. 344.	Depth 129 fms.	Lat. 40° 1′ N.	Long. 70° 58′ W.
Nr. 346.	Depth 44 fms.	Lat. 40° 25′ 35″ N.	Long. 71° 10′ 30″ W.
Nr. 345.	Depth 71 fms.	Lat. 40° 10′ 15″ N.	Long. 71° 04′ 30″ W.
Nr. 303.	Depth 306 fms.	Lat. 41° 34′ 30″ N.	Long. 65° 54′ 30″ W.
Nr. 336.	Depth 197 fms.	Lat. 38° 21′ 50″ N.	Long. 73° 32′ W.
Nr. 315.	Depth 225 fms.	Lat. 32° 18′ 20″ N.	Long. 78° 43′ W.
Nr. 373.	Depth 75 fms.	Lat. Off Charleston N.	Long. " " W.

Laetmatonice nuchipapillata, sp. nov.

Taf. 1, Fig. 2–7.

Diese Art wird durch ein einziges Exemplar vertreten, welches nicht gut erhalten ist. Das Tier hat eine weissgelbliche Färbung und ist in der Mitte etwa durch Quetschung auseinandergezerrt und hat die meisten Borsten, Cirren u. s. w. verloren. Die Länge des anscheinend mit allen seinen Segmenten erhaltenen Tieres beträgt ca. 4 cm.; die Körperform ähnelt derjenigen der *Laetmatonice producta* Grube, ist aber dorsoventral flacher und an der mittleren Körperstrecke wohl noch etwas mehr parallelseitig. Es sind 44 Segmente vorhanden, welche auf der Dorsalseite überall von den Elytren vollkommen bedeckt werden.

Der Kopflappen (Fig. 2) ist kurz längseiförmig gestaltet, nur wenig länger als breit und durch eine mediane etwa ⅓ seiner Breite betragende Längsbrücke in zwei Seitenhälften geteilt. Der unpaare Fühler, grade vorn an der Längsbrücke des Kopflappens entspringend, ist zum grössten Teil verloren gegangen, sein Basalglied ist etwa halb so lang wie der Kopflappen. Jederseits neben dem Fühler entspringt vorn unten vom Kopflappen (der linke ist abgerissen) ein starker keulenförmiger Augenstiel, der keinerlei Augenflecke trägt und etwas länger als das Basalglied des Fühlers ist. Als eine besondere Bildung, die meines Wissens sonst bei Laetmatonice nicht vorkommt, findet sich jederseits neben dem hinteren Teil des Kopflappens eine cylindrische, am Ende abgerundete, nach vorn gerichtete weisse Papille (Fig. 2), wohl ein Sinnesorgan (?).

Der Facialtuberkel ist etwas länger als das erste Ruder, aber wahrscheinlich beschädigt, und mit fadenförmigen Papillen besetzt; die Papillen des Facialtuberkels setzen sich auf die innere durch parallele

Längsfalten gerippte Wandung der Mundöffnung fort und nehmen hier eine keulenförmige Gestalt an. Die Mundöffnung wird ventral von einem längsgefurchten verkehrttrapezförmigen Mundpolster begrenzt, welches wiederum seitlich an das 1te bis 4te und hinten an das 5te Segment stösst.

Die Segmente des Mittelkörpers sind von ziemlich gleicher Breite und etwa 8-mal breiter als lang, nur gegen die Körperenden, wo der Körper verjüngt ist, sind die Segmente etwa 4- bis 5-mal breiter als lang.

Von den Rudern ist das erste einästig und trägt an seiner Aussenseite am Ende zwei übereinanderstehende Cirren, und nach innen von diesen ein Bündel feiner glatter Haarborsten, welches quer vor den Kopflappen vorgestreckt wird. Alle folgenden borstentragenden Ruder (Fig. 3) sind tief zweiästig. Der ventrale schlank kegelförmige Ruderast, etwa halb so lang wie das Segment breit ist, ist etwa doppelt so lang wie der dorsale Ruderast, und an seiner Oberfläche durch kleine eiförmige Papillen rauh erscheinend (nicht mit eingezeichnet). Der Ventralcirrus der Ruder ist kurz, fadenförmig, entspringt etwa um $\frac{1}{3}$ der Länge des ventralen Ruderasts von dessen Basis entfernt und erreicht noch nicht $\frac{1}{3}$ von dessen Länge.

Der dorsale Ruderast, welcher an den Elytrenrudern höher am Körper hinaufgerückt ist als an den Cirrenrudern, trägt an letzteren einen langen, fadenförmigen, ungegliederten Dorsalcirrus; der Dorsalcirrus entspringt mit stark kegelförmiger Basis um $\frac{1}{3}$ der Länge des dorsalen Ruderastes vor dessen Spitze, ist am Ende ganz schwach länglich-keulig verdickt und übertrifft den ventralen Ruderast an Länge. Dorsal- und Ventralcirrus sind glatt.

Die Elytren sind in 18 Paaren vorhanden nach der Anordnung: 2, 4, 5, 7 . . . 21, 23, 25, 28, 31, 34, 37, 40. Die Elytren sind an der Peripherie wie auf ihrer Oberfläche glatt, dünn und etwas schlaff und decken sich gegenseitig so, das sie etwa an den Elytrophor der Gegenseite heranreichen; die beiden letzten sind beträchtlich kleiner als die vorhergehenden. Die Form der Elytren ist rundlich-oval (Fig. 4), ihr Insertionspunkt liegt seitlich am Ende ihrer längeren Achse, wo das Elytron mit etwas convexem Saum die Rückenseite des dorsalen Ruderastes umfasst.

Vom 2ten Segment an finden sich an allen Rudern dreierlei Borstenformen, davon zwei am dorsalen Ruderast. Am dorsalen Ruderast finden sich erstens feine glatte haarförmige in eine lange Spitze auslaufende Haarborsten [diese allein am 1sten Ruder] (Fig. 5), welche unterhalb des spitzkegelförmigen Endes des dorsalen Ruderastes in Gestalt eines dichten Bündels entspringen und soweit seitwärts reichen wie der ventrale Ruderast. Vor und über diesem Bündel entspringen zweitens wenige starke braune lange Borsten [fast überall abgebrochen] (Fig. 6), mit auf beiden Seiten pfeilförmig gezähnter Spitze; die starken Pfeilzähne stehen zu 4 bis 5 jederseits und die unteren davon alternierend. Die Borsten des ventralen Ruderastes kommen nur in der Zahl von 3 bis seltner 4 vor und treten in 2 Absätzen am ventralen Ruderast aus, zwei am Ende des Ruderastes und eine an dessen Ventralfläche etwa um $\frac{1}{3}$ des Abstandes vom Ventralcirrusursprung bis zum Ruderende vom letzteren entfernt. Die Ventralborsten (Fig. 7) ähneln in ihrer Form sehr denen der *Laetmatonice kinbergi* Baird (Ehlers)[1]; sie sind in ihrem Endteil durch lange Kammfiedern einseitig besetzt und tragen dicht unterhalb der Kammfiedern einen stärkeren Dorn.

Fundort:
No. 227. Depth 573 fms.
Lat. St. Vincent N.
Long. " " W.

Pontogenia maggiae, sp. nov.

Taf. 1, Fig. 8–15.

Diese Art wird durch ein einziges Exemplar mit ausgestrecktem Rüssel vertreten, welches bei vollkommener Erhaltung 34 Segmente (?) enthält und incl. der hinten überstehenden Borsten mit dem Rüssel eine Länge von 2,1 cm. hat. Das Tier hat eine gelbliche Färbung und mit den Rudern eine grösste Breite von ca. 0,9 cm.

Der auf seiner Rückenfläche mit einem Überzug von Sandkörnchen und anderem Fremdmaterial bedeckte Körper hat eine gestreckt eiförmige Gestalt, ist mit den Rudern etwa halb so breit wie lang und etwa 3½mal so lang als ohne Ruder breit. Der Kopflappen (Fig 8) hat eine querovale Form, ist etwa doppelt so breit wie lang und hinten von einem etwas convexen Querwulst begrenzt, wie er bei Aphrodite u. s. w. vorkommt. Eine mediane Längsbrücke, an deren Vorderende der unpaare Kopffühler (hier verloren gegangen) mit kurzem geringeltem Basalglied entspringt, scheidet den Kopflappen in 2 Hälften. Der unterhalb des Fühlers erkennbare Facialtuberkel hat durch Besatz mit Papillen ein rauhes Aussehen. Seitlich vom Fühler und vorn und unten vom Kopflappen entspringt jederseits ein keulenförmiger Augenstiel, der keine Augenflecke trägt und etwa 2mal länger als das Basalglied des Fühlers ist. Die beiden Palpen sind ziemlich lang und fadenförmig, fein quer geringelt, im Übrigen glatt und reichen nach hinten gelegt etwa über die ersten 8 Segmente hinweg. Das bei eingezogenem Rüssel die Mündöffnung von unten her begrenzende Mundpolster ist verkehrt flach-dreieckig gestaltet, nach hinten mässig abgerundet und wird seitlich vom 1sten und 2ten, hinten vom 3ten Segment begrenzt. Der ausgestülpte, glatte, cylindrische Rüssel trägt am Vorderende seine quere kieferlose Mündungsspalte, welche am dorsalen und ventralen Umfang eine Reihe von Papillen trägt, welche jederseits durch einen Einschnitt von der anderen getrennt ist; die Rüsselpapillen selbst sind abgeplattet, am Ende verbreitert und hierselbst in eine Anzahl kurzer stumpfer Läppchen zerschnitten. Die Segmente des Körpers sind an der breitesten Stelle (etwa der Körpermitte) etwa 6–7mal breiter als lang ohne Ruder.

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[1] Ehlers, Florida-Anneliden, 1887, Taf. 8, Fig. 4.

Von den Rudern trägt das 1ste einästige zwei Fühlercirren, von denen der einzig erhaltene ventrale fadenförmig und ungegliedert, und $1\frac{1}{2}$ bis 2mal länger als das Ruder ist.

Die vom 2ten Segment an zweiästigen Ruder bestehen aus einem kurzen, dickkegelförmigen Dorsalast, der am Ende stumpf abgerundet und etwa $\frac{1}{2}$mal so lang wie der Ventralast ist und an den Elytrenrudern etwas weiter dorsalwärts am Körper hinaufgerückt ist als an den Cirrenrudern, und einem schlank kegelförmigen längeren Ventralast (Fig. 9). Der ventrale Ruderast ist an den mittleren Körpersegmenten etwa halb so lang wie der Körper breit, und hat durch kugelig hervortretende Papillen an seiner Oberfläche ein warziges Aussehen.

Der Ventralcirrus entspringt an der Mitte des ventralen Ruderastes und reicht an den mittleren Segmenten des Körpers gut bis zur Spitze, an den hintersten Segmenten nicht bis zur Spitze des ventralen Ruderastes. Der Dorsalcirrus, fadenförmig wie der ventrale, ist ungegliedert, dünn und ziemlich lang, an der Spitze ein wenig länglich keulenförmig verdickt und ungefähr so lang wie der Körper breit ist; der Dorsalcirrus entspringt mit kegelförmiger, durch Papillen rauher Basis oben hinten am Ende des dorsalen Ruderastes.

Die Elytren bedecken den Rücken des Tieres vollkommen und sich gegenseitig teilweise, und treten in 15 Paaren auf nach der Anordnung: 2, 4, 5, 7, . . . 21, 23, 25, 27, 29 (hinten nicht ganz sicher, da ohne stärkere Maltraitierung des Tieres die Elytrenstellung nicht ganz genau zu erkennen war). Die Elytren (Fig. 14) sind ganz hell, dünn, auf der Oberfläche und am Rande glatt, ohrförmig gestaltet, etwa um $\frac{1}{4}$ länger als breit; die Elytren des 1sten Paares (Fig. 15) sind annähernd kreisförmig und seitlich in eine stumpfe Spitze ein wenig vorgezogen.

An den Rudern sind 4 Formen von Borsten vorhanden. Die 1ste Form (Fig. 13) findet sich am 1sten Ruder allein, am 2ten und 3ten Ruder (ob auch an den folgenden Rudern??) neben den starken Ventralborsten am ventralen Ruderast; diese Borsten sind sehr fein haarförmig gestaltet, in ihrer Aussenhälfte mit feinen Sägehärchen einseitig besetzt und in einem kleinen kurzen Bündel etwa von $\frac{1}{3}$ der Länge der starken langen Ventralborsten vereinigt, welches am 2ten und 3ten Ruder etwas hinter der Spitze des ventralen Ruderastes und an dessen Unterseite entspringt. Am Ende der ventralen Ruderäste stehen 2 bis 3 grosse gelbe schwach gebogene Borsten (Fig. 12) in zwei Absätzen übereinander, welche an ihrer convexen Seite 5 starke, schräg gegen die Spitze gerichtete spitze Zähne tragen; 2 dieser Borsten entspringen an der Spitze des ventralen Ruderastes und die 3te etwas weiter körperwärts ungefähr halbwegs zwischen dem Ursprung des Ventralcirrus und der Ruderastspitze. Von den dorsalen Borsten ist die grosse starke Form (Fig. 11) in einem nach aussen seitwärts geöffneten Bogen von mehr oder minder halbkreisförmiger Gestalt am oberen Umfange des dorsalen Ruderastes angeordnet; die dorsalen Borsten sind fächerartig auseinandergespreizt, an ihrer Spitze etwas hakig umgebogen, von goldigbrauner Färbung und allseitig mit zerstreuten, kegelförmig abgestumpften kleinen Tuberkeln besetzt. Innerhalb des Ringes dieser starken Dorsalborsten, welche an allen Cirren- und Elytrenrudern vorhanden sind, entspringen in der Gestalt eines flach ausgebreiteten Bündels medianwärts die feinen biegsamen Haarborsten, welche sich über der Rückenfläche des Tieres zu einem schwach gelblich schimmernden dünnen Rückenfilz mit einander verflechten. Die Haare des Rückenfilzes, welcher durch Auflagerung von Fremdkörpern bei dem vorliegenden Tier verstärkt war, sind unverzweigt und glatt, abgesehen von einer feinen erhabenen Längsstreifung (Fig. 10).

Die vorliegende Art stimmt mit der *Pontogenia sericoma* Ehlers[1] aus dem gleichen Gebiet in der Entwicklung des Rückenfilzes und den ungegliederten Cirren überein, unterscheidet sich von der letzteren aber durch den Besitz von Augenstielen und wie auch von den anderen Pontogenia-Arten durch die Form der Borsten, welche Hermione-artig gestaltet sind. *Pontogenia maggiae* mag daher als eine Pontogenia mit Hermione-artigen Borsten und als vermittelnde Form zwischen Pontogenia und Hermione aufgefasst werden, auf Grund der abweichenden

[1] **Ehlers, Florida-Anneliden, 1887, p. 46, Taf. 7.**

Borsten ist dann mit Rücksicht auf *Pontogenia maggiae* der Charakter der Gattung Pontogenia zu erweitern. Eine Modificierung des Gattungscharakters von Hermione hätte einzutreten, wenn man die vorliegende Art als Hermione mit Pontogenia-Rückenfilz und ungegliederten Cirren auffassen will.

Fundort:
Nr. 157. Depth 120 fms.
Lat. Montserrat N.
Long. " W.

SIGALIONIDAE.

Leanira simplex Ehlers.

Taf. **1**, Fig. 16, 17.
Sthenelais simplex Ehlers, Florida-Anneliden, 1887, p. 60, Taf. **13**, **14**.

Von dieser Art liegen mir nur wenige hinten verstümmelte Exemplare vor, welche zu der von Ehlers als *Sthenelais simplex* beschriebenen Art gehören, aber mit Rücksicht auf den Typus der Gattung Leanira, die *Leanira quatrefagesi* Kinberg[1] der Gattung Leanira unterzuordnen sind.

Abgesehen davon, dass die von Ehlers untersuchten Exemplare der vorliegenden Art blattförmige Anhängsel an der Basis des Fühlers trugen, die an den mir vorliegenden Tieren verloren gegangen waren und die auch bei *Leanira quatrefagesi* Kinberg und *Leanira hystricis* Ehlers[2] nicht abgebildet sind, stimmt *Leanira simplex* in den Hauptcharakteren mit beiden genannten Arten überein. Es sind hier noch einige ergänzende Bemerkungen hinzuzufügen.

Der unpaare Kopffühler ist (Fig. 16), das Basalglied mit eingerechnet, dreigliedrig (auch bei dem Originalexemplar der Göttinger Sammlung) und viel kürzer als der Dorsalcirrus des 1sten Ruders; ferner halte ich den inneren Cirrus (Papille?) des 1sten Ruders für 3gliedrig (vergl. *Leanira hystricis*), während Dorsal- und Ventralcirrus des 1sten Ruders offenbar ungegliedert sind. Über die Ruder ist auch noch hinzuzufügen, dass an der Dorsalseite derselben zwischen Kieme und dorsalem Ruderast drei schmale gestreckte Wimperpolster vorkommen, von denen das mittlere das längste und doppelt so lang wie das obere ist. Figur 17 stellt eine der geblätterten ventralen Quirlborsten dar, die für Leanira in Verbindung mit den zusammengesetzten Ventralborsten charakteristisch sind. Über dass erste Auftreten der Kiemen ist noch zu bemerken, dass dieselben an den elytrenlosen Rudern schon am 6ten, an den Elytrenrudern am 6ten oder 7ten als kleiner Vorsprung zu erkennen sind.

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[1] Kinberg, Fregatten Eugenies Resa, 1857, Taf. **9**.

[2] Ehlers, Zeitschr. wiss. Zool., 1875, Bd. 25, p. 35, Taf. **2**.

Fundort:
Nr. 344. Depth 129 fms.
Lat. 40° 1′ N.
Long. 70° 58′ W.

Sthenelais spec.

Ein verstümmeltes Exemplar einer Sthenelais mit Wimperpolstern an der Oberseite der Ruder, welches sämtliche Elytren eingebüsst hat, liegt vor.

Fundort:
Nr. 329. Depth 603 fms.
Lat. 34° 39′ 40″ N.
Long. 75° 14′ 40″ W.

Sthenelais gracilior, sp. nov.

Taf. 1, Fig. 18, Taf. 2. Fig.19–23.

Diese Art ist vertreten durch ein einziges, ziemlich schlecht erhaltenes, hinten verstümmeltes Exemplar mit 54 Segmenten und von ca. 2,2 cm. Länge. Die Körperform dieses Tieres ist schlank, ziemlich parallelseitig, nach hinten zu allmählich an Breite abnehmend; der Körper ist am breitesten etwa in der Gegend des 12ten Ruders und nimmt von hier an nach vorne zu ebenfalls ab; die grösste Körperbreite beträgt etwa 0,15 cm., mit den Borsten etwa 0,4 cm. Die Segmentbreite der mittleren Segmente beträgt etwa das 3fache ihrer Länge. Der Körper des gelblich gefärbten Tieres erscheint im Querschnitt vierkantig, fast quadratisch und ist auf seiner Rückenfläche nur hinter dem Kopflappen in seiner Vorderhälfte im Bereich des Pharynx stärker gewölbt.

Der Kopflappen ist (Fig. 19) querbreiter, etwa 2mal breiter als lang, vorn und hinten ganz wenig concav eingezogen. Durch eine etwa $\frac{1}{3}$ der Kopflappenbreite betragende mediane Längsbrücke, an deren Vorderende der verloren gegangene Fühler entsprang, wird der Kopflappen in 2 deutliche Seitenhälften geteilt. Es sind zwei Paar halbmondförmige Augen vorhanden, von denen die kleineren oberhalb und seitwärts von der Fühlerbasis, die beiden grösseren einander mehr genäherten unterhalb der Fühlerbasis stehend von dieser mehr oder weniger verdeckt werden.

Der unpaare Kopffühler, der noch in einem basalen Reste, der der Sichtbarmachung der Augen wegen entfernt wurde, vorhanden war, nahm mit seinem Basalgliede das mittlere Drittel der Kopflappenbreite ein und ist wahrscheinlich mehrfach länger als der Kopflappen.

Die schlanken glatten Palpen, welche an ihrer Basis wie bei anderen Arten die blattförmigen Praebuccallamellen tragen, reichen, nach hinten gelegt, etwa über die 7 ersten Segmente hinweg. Hinter den Hinterecken des Kopflappens steht seitlich je eine kleine pilzförmige, zusammengedrückte Papille (Sinnesorgan). Die untere Begrenzung der Mundöffnung wird durch ein verkehrt dreieckiges, hinten abgestumpftes Mundpolster gebildet, welches wieder seitlich vom 1ten bis 3ten und hinten vom 4ten Segment begrenzt wird.

Die normalen mittleren Rudersegmente sind etwa 3mal breiter als lang und so breit wie die Ruder ohne Borsten lang sind, in der hinteren Körperhälfte werden die Ruder länger als die Körperbreite.

An den mittleren zweiästigen Rudern (Fig. 20) nehmen die nur wenig von einander getrennten Ruderäste etwa das äussere Drittel ein, der dorsale Ast ist etwa halb so hoch wie der ventrale und kaum halb so lang wie dieser an den hinteren Segmenten, an den vorderen Segmenten etwas länger. Die Äste der seitlich etwas compressen Ruder tragen am Ende einige fadenförmige Papillen. An der Dorsalseite der Ruder unterhalb der Kiemen stehen drei schmale gewimperte Polster, von denen das mittlere das längste ist. Der Ventralcirrus ist zart, fadenförmig und nimmt an den hinteren Rudern etwa das mittlere Drittel am ventralen Ast ein, während er am 2ten und 3ten Ruder mindestens die Aussenhälfte desselben an Länge einnimmt.

Von den 3 fadenförmigen Cirren, welche das 1ste einästige Ruder trägt, ist der dorsale reichlich doppelt so lang als das Ruder, der ventrale und der mediane Cirrus, die unter einander ungefähr gleich lang sind, etwa so lang wie das Ruder.

Die Elytren (Fig. 18), welche die Rückenfläche des Tieres so gut wie ganz bedecken, stehen an den Segmenten nach der Anordnung: 2, 4, 5, 7 . . . 23, 25, 27, 28, 29 . . . , vom 27sten Segment an an jedem Segment. Die Elytren sind zart, durchsichtig, an den vordersten Segmenten rundlich oval, an den mittleren nierenförmig und tragen am medianen Hinterrande eine geringere Zahl von zugespitzten abgeflachten zarten Papillen. Auf der Oberfläche der Elytren finden sich zweierlei Papillenformen; ein grosser Teil der inneren und hinteren Elytrenoberfläche ist besetzt mit zarten, zerstreuten, kurzfadenförmig, zugespitzten Papillen.

An der concaven inneren Elytronkante findet sich die zweite Papillenform in Gestalt von kleinen, rundlich warzenförmigen hellen Erhebungen, welche einen ziemlich breiten Längsstreifen bilden, in welchem durchschnittlich 5–6 Papillen übereinander stehen. Eingelagert in die Elytrenoberfläche findet sich in ein unregelmässiges Maschenwerk bildender Anordnung gelbliches Pigment. Das 1ste Elytron, welches an seiner Peripherie kürzere und feinere Randpapillen trägt, als die hinteren Elytren, trägt auf seiner ganzen Oberfläche nur die eine Form der zerstreuten Fadenpapillen der hinteren Elytren, während der Papillengürtel am Vorderrande fehlt.

Die Borsten treten in 3 Formen auf, von denen die eine am 1sten Ruder einen senkrechten Fächer bildet; dies sind zarte einfache Haarborsten (Fig. 21), welche in ihrer Aussenhälfte mit Querreihen von Sägezähnchen besetzt sind und auch am Dorsalast der hinteren Ruder auftreten. Im ventralen Ruderast stehen zu oberst ganz wenige einfache Haarborsten (Fig. 22), welche in ihrem Spitzenabschnitt mit Quirlen von Blattzähnchen besetzt sind.

Die Masse der Ventralborsten wird gebildet aus kräftigen zusammengesetzten Borsten (Fig. 23), deren Schaft am Ende etwas verbreitert ist und hier ein Paar Zähnchen zeigt; der Anhang dieser Borsten ist mehr oder minder lang, glatt, mässig gebogen und mit Einschnürungen am concaven Rande versehen.

Die vorliegende Art scheint nahe verwandt zu sein mit *Sthenelais grubei* Treadwell und *S. setosa* Bush. Die erstere[1] hat am Rande der Elytren Papillen in geringer Zahl, die Elytrenoberfläche scheint glatt zu sein, da von dieser keine Papillen erwähnt werden.

Die *Sthenelais setosa*[2] von Bermuda hat Elytren mit Rand- und Oberflächenpapillen, doch werden die hellen Papillenwärzchen am Vorderrande der Elytren nicht erwähnt.

Fundort:
Nr. 287. Depth $\frac{7\frac{1}{2}}{50}$ fms.
Lat. Barbados N.
Long. " W.

Psammolyce floccifera, sp. nov.

Taf. 2, Fig. 24–30.

Diese Art liegt mir nur in wenigen, sämtlich hinten verstümmelten Exemplaren vor, von denen das stärkste bei einer Länge von 2.2 cm.

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[1] Treadwell, Polychaetous Annelids of Porto Rico, 1902, p. 187.

[2] Bush, Trans. Conn. Acad., 1900, vol. 10, p. 666.

und einer grössten Breite (in der vorderen Körperhälfte) mit den Rudern von 0,5 cm. noch 50 Segmente enthält; ein wenig schwächeres Exemplar hatte noch 45 Segmente bei einer Länge von 2 cm. Die Färbung der Tiere ist graurötlich bis gelbrötlich, der Körper auf seiner Dorsalseite mehr oder minder stark mit Sand u. s. w. incrustiert, an der Unterseite mit einem Überzug von Schlamm von rostroter oder schwärzlicher Farbe bedeckt.

Der Körper der Tiere hat eine gestreckte Gestalt, erreicht seine grösste Breite im vorderen Körperdrittel und bleibt dann bei sehr allmählicher Breitenabnahme noch hinten zu nahezu parallelseitig. Die grösste Körperbreite liegt etwa in der Gegend des 15ten Segments und nimmt nach vorn zu ebenfalls ab. Der Körper ist nur wenig höher als breit, ventral flach, auf der Rückenseite etwas gewölbt, am stärksten im Bereiche des Pharynx. Eine tiefe ventrale Medianfurche beginnt gleich hinter dem Mundpolster, welches etwa die Form eines hinten etwas verbreiterten Rechtecks hat und welches seitwärts vom 1sten bis 3ten, hinten vom 4ten Segment begrenzt wird.

Die mittleren Körpersegmente sind an der breitesten Körperstelle etwa 5- bis 6mal, in der hinteren Körperhälfte etwa 3–4mal breiter als lang (ohne Ruder).

Der Kopflappen (Fig. 24) ist querbreiter, 2mal breiter als lang, seitlich gerundet, vorn etwas concav, und diese Concavität wird durch das kegelförmige, aufgeblasene Basalglied des unpaaren Kopffühlers ausgefüllt. Der Fühler selbst ist fadenförmig und etwa 4mal länger als der Kopflappen und auch als sein Basalglied und überragt noch etwas die Borsten des 1sten Ruders. Der Kopflappen trägt 2 Paar halbmondförmiger Augenflecke, die zusammen ein queres Rechteck bilden, und von denen die kleineren oberen hart neben der Fühlerbasis stehen, während die unteren grösseren von oben her durch die Fühlerbasis verdeckt werden. Der Kopflappen kann unter Umständen durch die vorspringende Mittelpartie des 2ten Segments vollkommen verdeckt sein. Die kegelfadenförmig gestalteten Palpen übertreffen den Fühler etwas an Länge. Von den drei cirrusartigen Anhängen, welche das 1ste Ruder ausser einem senkrechten Borstenfächer trägt, ist der Dorsalcirrus, der wie der Ventralcirrus fadenförmig ist, mindestens von Ruderlänge und überragt die Borsten, während der ventrale Buccalcirrus solang wie die Borsten ist. Der dritte Cirrus ist nur eine kurze, kegelförmige Papille mit dunkler Spitze, welche, am Grunde des 1sten Ruders an seiner medialen Seite stehend, hier durch den Fühler vollkommen verdeckt wird.

Die mit Ausnahme des 1sten Ruders zweiästigen normalen mittleren Ruder (Fig. 25) sind etwa ½, mit den Borsten etwa ⅔ so lang wie der Körper breit ist, und etwa halb so breit wie hoch. Der kürzere Dorsalast ist etwa halb so hoch wie der ventrale Ast und seine Borsten reichen halb so weit seitwärts wie die längsten Ventralborsten. Der fadenförmige Ventralcirrus ist etwa halb so lang wie das Ruder, der stärker entwickelte des 2ten Ruders reicht so weit wie die Borsten desselben. Die Ruder tragen einen Besatz von zahlreichen fadenförmigen Papillen von verschiedener Länge und Stärke, welche sich an den Enden der Ruderäste und am seitlichen und unteren Umfange der Ruder finden; an der Bauchseite des Körpers, namentlich in der Gegend des Mundpolsters, finden sich lange Fadenpapillen, welche dieser Körpergegend ein pubescentes Aussehen verleihen.

Eine besondere Bildung der Ruder (wohl auch bei anderen Arten) besteht darin, dass (Fig. 26) am dorsalen Ruderast dicht am und medianwärts vom Borstenbündel sich eine häutige Lamelle vorfindet, die vom 2ten Ruder an, wo sie besonders stark entwickelt ist, auftritt. Diese Lamellen haben an den mittleren Rudern eine etwa gestreckteiförmige, etwas gebogene Gestalt, sind dem Körper parallel gerrichtet und greifen je mit ihrem Hinterende auf die nächstfolgende über, derart, dass ihre Gesammtheit (Fig. 26) einen gewellten, häutigen Saum an der Dorsalseite der Ruder darstellt. Hinter diesem Lamellensaum, welcher gleichsam den unteren Abschluss einer durch die Elytren von oben her abgeschlossenen Art von Kiemenhöhle für die Kiemen bildet, steht an jeder Segmentgrenze hinten an der Ruderbasis eine strichförmige, seitlich zusammengedrückte Papille.

Kiemen sind vom 2ten Segment an zu erkennen, sie sind kurz und erreichen nicht den dorsalen Ruderast; von der Basis der Kiemen läuft eine weissliche langgewimperte Leiste herab bis an den beschriebenen häutigen Lamellensaum der Ruder.

Die Elytren (Fig. 27) stehen vom 27ten Segment an, bis wohin sie wie bei Sthenelais angeordnet sind, an allen Segmenten und lassen mit Ausnahme der vordersten den Rücken der Tiere ganz frei. Die Elytren sind nierenförmig, die vordersten weniger deutlich als die hinteren, dafür aber am Vorderrande deutlicher zweilappig. Der Saum der Elytren ist mit Ausnahme der concaven Randstrecke mit fadenförmigen Papillen besetzt, welche am Vorderrande am längsten, 3- bis 4mal länger als die des Hinterrandes sind. Die Oberfläche der Elytren ist mit zahlreichen zerstreuten Papillen bedeckt, welche erst nach vorsichtiger Entfernung des die Elytren bedeckenden Fremdkörperüberzuges zu Tage treten; diese Papillen sind kurz fadenförmig, kräftiger als die Papillen des Randes und am freien Ende scheibenartig verbreitert. Im Anschluss an die Papillen der Elytrenoberfläche, sind die ersteren ähnlichen, aber complizierter gestalteten Papillen zu erwähnen, welche auf der Rückenfläche des Tieres stehen und gleich jenen hauptsächlich zum Festhalten des Fremdkörperüberzuges dienen. Nach vorsichtiger Entfernung der Fremdkörper erkennt man die Papillen der Rückenfläche als feine Flöckchen von verschiedener Grösse auf der Haut; die Papillen (Fig. 28) bestehen aus einem stärkeren Stamm, welcher noch wieder gegabelt sein kann, und welcher kurze fadenförmige Nebenäste trägt, die am Ende scheibenartig verbreitert sind. Jeder Endast dieser Papillen mag als einer einzelnen der Papillen der Elytrenoberfläche gleichwertig anzusehen sein. Die Haftpapillen des Rückens, an denen man die Fremdkörper, wie Sand u. s. w. klebend findet, werden von Grube in seiner Übersicht der Sigalioniden (Berichte der Schlesisch. Gesellschaft, 1874) erwähnt von Psammolyce arenosa, finden sonst in den Beschreibungen meines Wissens keine nähere Berücksichtigung, finden sich aber doch wohl bei allen Arten von Psammolyce.

Die Borsten finden sich in 2 Formen, von denen die eine allein am 1sten Ruder und am Dorsalast der zweiästigen Ruder sich findet; sie besteht in zarten, einfachen Haarborsten (Fig. 29), welche in ihrer Aussenhälfte mit feinen Sägezähnchen zweizeilig besetzt sind. Die zusammengesetzten Borsten (Fig. 30) der ventralen Ruderäste nehmen von oben nach unten an Länge ab. Der etwas gebogene Schaft dieser Borsten ist dicht unter seinem Ende mit mehreren (bis 12 etwa) schwach vorspringenden Querleisten versehen und trägt ein mässig langes, parallelseitiges Endglied, welches an manchen Borsten 2- bis 3mal länger ist als an anderen, und an seiner Spitze in 2 schlanke Zähne gespalten ist, die viel kürzer als die halbe Länge des Endgliedes sind.

Von den Arten von Psammolyce, welche vielleicht mit der vorliegenden zusammenfallen mögen, wird bei *Ps. occidentalis* McIntosh,[1] wie bei *Ps. atlantica* Grube[2] der Kopflappen als augenlos beschrieben. Bei der letzteren wird erwähnt, dass am 2ten Ruder ein häutiger blattartiger Saum (siehe oben) an der Dorsalseite vorkommt. *Ps. rigida* Grube, welche nach Treadwell[3] für Westindien angegeben wird, unterscheidet sich durch einspitzige Endglieder der Ventralborsten. Ob auf das Vorhandensein oder Fehlen der Augen hier Gewicht zu legen ist bei Unterscheidung von Arten, vermag ich hier nicht zu entscheiden, während bei Formen wie Hyalinoecia, Onuphis, Diopatra die Erkennbarkeit der Augen sicherlich durch den Erhaltungszustand der Tiere beeinflusst wird, und keinen besonderen Unterscheidungswert besitzt.

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[1] McIntosh, Challenger Reports, 1885, vol. 12. Annelida, p. 146.

[2] Grube, Annelidenausbeute von Gazelle. Monatsb. k. Akad. Wiss. Berlin, 1877, p. 521.

[3] Treadwell, Polychaetous Annelids of Porto Rico, 1902, p. 188.

Fundort:

Nr. 177. Depth 118 fms.
Lat. Dominica N.
Long. " W.

Nr. 176. Depth 391 fms.
Lat. Dominica N.
Long. " W.

Nr. 287. Depth $\frac{7\frac{1}{2}}{50}$ fms.
Lat. Barbados N.
Long. " W.

Nr. 273. Depth 103 fms.
Lat. Barbados N.
Long. " W.

POLYNOIDAE.

Lepidonotus citrifrons, sp. nov.

Taf. 2, Fig. 31–38; Taf. 3, Fig. 39–40.

Die vorliegende Art, welche durch den Besitz eines wohlentwickelten Facialtuberkels ausgezeichnet ist, ist nur durch wenige Exemplare vertreten. Die grössten Exemplare haben eine Länge von etwa 2.7 cm., die Länge des Körpers ist etwa $2\frac{2}{3}$mal grösser als die grösste Körperbreite incl. Borsten (etwa Mitte des Körpers). Der graugelblich gefärbte Körper der Tiere hat eine kurze, länglicheiförmige Gestalt, ist in der hinteren Körperhälfte ganz allmählich gegen das Hinterende verjüngt und nimmt etwa vom 6ten Segment an gegen das Vorderende hin an Breite ab.

Der vollständig erhaltene Körper setst sich aus 27 Segmenten zusammen, von denen die mittleren normalen Segmente etwa 3mal breiter als lang sind (ohne Ruder). Die Rückenseite des Körpers wird vollkommen bedeckt durch 12 Paar ziemlich derber Elytren nach der Stellung: 2, 4, 5, 7 . . . 21, 23.

Der Kopflappen (Fig. 31) ist querbreiter, an der Basis hinten 1 mm. breit, etwa 2mal breiter als lang und im Umriss undeutlich 6-eckig; die hinteren Ecken des Kopflappensechsecks werden durch 2 Paar Augen markirt von dunkler Farbe, von denen die vorderen die grösseren sind. Von den drei in gleicher Höhe entspringenden Fühlern (der unpaare war verloren gegangen), welche wie die Cirren, die bei Lepidonotus bekannte Form mit keuligem Endteil haben, sind die paarigen wie die Palpen und Cirren glatt, mindestens 3mal länger als der Kopflappen, ihr Basalglied ist etwa halb so dick wie das des Mittelfühlers; die Fühler sind von Farbe braun wie die Palpen, an der verdickten Partie weisslich gefärbt.

Die kräftigen, kegelfadenförmigen Palpen reichen so weit wie die paarigen Fühler nach vorn.

Unterhalb des unpaaren Fühlers über dem Munde entspringt, das Basalglied des Fühlers etwa zur Hälfte überragend, vom Grunde des Kopflappens (Fig. 31 f.) der braune, glatte, citronen- oder kegelförmige Facialtuberkel. Von hinten her wird ein Teil des Kopflappens und damit das hintere Augenpaar mehr oder minder verdeckt durch einen vorne flach convexen, etwas kapuzenartig vorspringenden, dicken nuchalen Lappen der medianen Partie des 1sten Segments. Das die Mundöffnung von unten her begrenzende Mundpolster ist von quadratischem bis rechteckigem Umriss, und wird nach hinten vom 4ten, seitwärts vom 1sten bis 3ten Segment begrenzt.

Das 1ste Ruder trägt ein kleines Borstenbündel und zwei Buccalcirren, von denen der dorsale etwa 3mal, der ventrale etwa 4mal länger ist als das Ruder. Die Fühlercirren sind wie die Dorsalcirren der mittleren Ruder weisslich und braun gebändert.

An den mittleren 2ästigen Rudern (Fig. 32), deren Äste beide in eine kurze kegelförmige Spitze endigen, ragt der Ventralast etwa um $\frac{1}{3}$ weiter vor als der Dorsalast und ist etwa $\frac{1}{3}$, mit Borsten halb so lang, wie der Körper breit ist. Der Dorsalcirrus ist etwa so lang wie das ventrale Borstenbündel, der Ventralcirrus nimmt bezüglich seiner Länge und seines Ursprungs etwa das mittlere Drittel am ventralen Ruderaste ein mit Ausnahme des 2ten Segments, wo er doppelt so lang wie das Ruder ist.

Die Elytren (Fig. 33) sind mit Ausnahme der vordersten mehr eiförmigen, nierenförmig begrenzt, am Hinter- und Seitenrande durch ziemlich lange Fadenpapillen gefranzt und auf ihrer Oberfläche mit zahlreichen Papillen verschiedener Form besetzt. Die Hauptmasse der Elytronflächenpapillen besteht aus kleineren (Fig. 36) gestielten Papillen, deren kugeliger Kopf mit ziemlich langen spitzen Stachelchen bedeckt ist.

Die in geringerer Zahl vorhandenen (namentlich auf dem hinteren Teil des Elytrons) grossen Papillen (Fig. 35) erscheinen in der Ansicht von oben (Fig. 34) kreisförmig und haben etwa die Form eines Pilzes, dessen Oberfläche am Ende wieder in der Form eines flachen Kegels vorgewölbt ist; spitzige Stachelchen bedecken auch den verdickten Teil dieser Papillen. Eine 3te Form von Papillen, wohl eine Modification der ersten, findet sich vor dem Innenrande des Elytrons (Fig. 37) und ist mehr oder minder schlank kegelförmig, am Ende 1- oder 2spitzig und an der Oberfläche mit kurzen stumpfen Stacheln bedeckt. Eine vierte Form von Papillen, die abweichend von den übrigen braun gefärbten, farblos, fadenförmig mit kopfig verdicktem Ende ist, findet sich noch am convexen Elytronrande (Fig. 38).

Von den Borsten, welche in beiden Ruderästen in grösserer Zahl vorhanden sind, bilden die schwächeren und kürzeren Dorsalborsten (Fig. 39) ein kegelförmiges Bündel, das etwa halb so weit reicht wie die längsten Ventralborsten; die Dorsalborsten sind am Ende einspitzig, nur schwach gebogen und in ihrer Aussenhälfte mit Querreihen feiner Sägezähne besetzt. Die Ventralborsten (Fig. 40) bilden einen breiten, senkrechten seitlich zusammengedrückten Fächer, sind ebenfalls einspitzig und wenig gebogen, sind in ihrer Endhälfte schwach verbreitert und tragen hier an der convexen Seite Querreihen ziemlich langer scharfer Dornen.

Am hinteren Körperende finden sich zwei schwach keulig-fadenförmige, braungebänderte Analcirren, welche so lang sind wie die letzten 6 bis 7 Segmente.

Fundort:

Nr. 273. Depth 103 fms.
Lat. Barbados N.
Long. " W.

Nr. 297. Depth 123 fms.
Lat. Barbados N.
Long. " W.

Nr. 290. Depth 73 fms.
Lat. Barbados N.
Long. " W.

Lepidonotus lacteus Ehlers.

Polynoë lactea Ehlers, Florida-Anneliden, 1887, p. 52, Taf. 9.

Es liegen mir mehrere Exemplare einer zur Lepidonotus-Gruppe gehörenden Polynoide vor, welche augenscheinlich mit der *Polynoë lactea* Ehlers aus dem Florida-Gebiet identisch sind.

Die vorliegenden Tiere gehören der Gattung Lepidonotus an, haben eine kurze, länglich eiförmige Gestalt und besitzen bei vollkommener Erhaltung 27 Segmente mit 12 Paar den Rücken vollkommen bedeckender Elytren nach der Stellung: 2, 4, 5, 7, . . . 21, 23. Die Tiere stimmen in der Bildung des Kopfes, der Ruder nebst Borsten und Elytren gut mit der Originalbeschreibung überein, die letztere ist aber durch einige ergänzende und berichtigende Bemerkungen noch zu erweitern.

Der als augenlos beschriebene Kopflappen trägt jederseits ein Paar schwarzer Augenflecken, welche die hinteren Ecken des etwa quersechseckigen Kopflappens einnehmen; die Augenflecke jedes Paares, von dem der vordere der grössere ist, stehen ziemlich nahe bei einander. Von der Mitte des 1sten Segments greift dorsal ein schmal dreieckig zugespitzter Nuchallappen auf den Kopflappen von hinten hinauf und reicht höchstens halb so weit nach vorn als die Entfernung vom hinteren Kopflappenende bis zum Basalgliede des unpaaren Fühlers beträgt.

Die grossen kegelförmigen Warzen der Elytrenoberfläche können noch schlanker und spitziger sein als sie von Ehlers (*loc. cit.*) abgebildet werden, ihre Basis ist zum Teil viel schärfer sternförmig begrenzt als dort, 5- bis 8eckig, indem die Zwischenräume zwischen den Ecken des Sternes stark concav ausgebuchtet sind. Das Hinterende des Körpers trägt zwei Analcirren, die etwa so lang sind wie die 6 letzten Segmente.

Es ist an dieser Stelle noch hinzuweisen auf einige Druckfehler, die sich in der Originalbeschreibung der Art vorfinden. Die Zahl der Elytrenpaare wird dort mit 18 angegeben, in der Aufzählung der Elytren tragenden Segmente jedoch werden nur 15 solche angeführt. Diese sich widersprechenden beiden Angaben stehen ebenfalls im Gegensatz zu der Angabe der Gesamtsegmentzahl der Tiere, welche hingegen ihrerseits mit der Angabe harmoniert, dass *Polynoë lactea* in die Gruppe I *A* bb 2 der Grube'schen Polynoëenzusammenstellung gehört,[1] in der die Lepidonotus-formen untergebracht sind.

Nach dem Gesagten erscheint es mir kaum zweifelhaft, dass bei der grossen Übereinstimmung der mir vorliegenden Tiere mit der *Polynoë lactea* Ehlers und nach Berichtigung der offenbar unrichtigen, dem Charakter der Gattung Lepidonotus widersprechenden Angaben in der Originalbeschreibung, die *Polynoë lactea* zur Gattung Lepidonotus gehört.

Fundort:

Nr. 270. Depth 175 fms.
Lat. St. Vincent N.
Long. " W.

Nr. 172. Depth $\frac{62}{180}$ fms.
Lat. Guadeloupe N.
Long. " W.

Nr. 283. Depth 273 fms.
Lat. Barbados N.
Long. " W.

Nr. 157. Depth 120 fms.
Lat. Montserrat N.
Long. " W.

Nr. 154. Depth 298 fms.
Lat. Montserrat N.
Long. " W.

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[1] Grube, Bericht. Schlesisch. Gesellsch., 1875, p. 41.

Halosydna fuscomarmorata Grube. (?)

Taf. 3, Fig. 41–44.

Polynoë fuscomarmorata Grube, Bericht. Schlesisch. Gesellsch., 1875, p. 42, 43.

Diese Art liegt mir in einem zerbrochenen Exemplar von ca. 1,8 cm. Länge vor, welches von der pacifischen Küste Südamerikas, von Payta (Peru) herstammt.

Polynoë fuscomarmorata wird von Grube nur mit wenigen kurzen Angaben (*loc. cit.*, p. 43) angeführt. Da die Grube'schen Angaben sich sehr wohl auf das mir vorliegende Exemplar, welches wie das Grube'sche Exemplar von der peruanischen Küste stammt, beziehen lassen, habe ich geglaubt, um die Aufstellung einer neuen Art etwa zu vermeiden, das Exemplar von Payta unter dem Grube'schen Artnamen hier aufführen zu dürfen.

Das Exemplar von Payta hat bei vollständiger Erhaltung eine Zahl von 37 Segmenten und eine graugelbliche Färbung, auf der Dorsalseite macht sich an einigen Stellen noch eine dunkle verloschene Querbänderung der Segmente bemerkbar. Die Dorsalseite wurde von den Elytren, welche grösstenteils verloren gegangen sind, wohl grade eben bedeckt. Die grösste Körperbreite des Tieres beträgt mit Rudern 0,55 cm. und die mittleren Segmente sind (ohne Ruder) ungefähr 6mal breiter als lang.

Der Kopflappen von graurötlicher Färbung, ist etwa 4eckig-kreisförmig, so lang wie breit, in der Mitte am breitesten und wird durch eine Längsmedianfurche in 2 Hälften geteilt. Der Kopflappen trägt 2 Paar Augenflecke, von denen die vorderen grösseren in der Mitte des Seitenrandes, die hinteren an den Hinterecken des Kopflappens stehen. Das 1ste Segment ragt dorsal median mit einer schwach convexen Falte auf den Kopflappen hinauf, die hinteren Augen fast verdeckend. Die Basalglieder der verlorenen Fühler sind von gleicher Länge, die seitlichen etwa halb so dick als das des unpaaren Fühlers.

Die Palpen sind wie die Cirren glatt, kräftig kegelförmig, doppelt so lang wie der Kopflappen, mit einem dorsal-medianen Längswulst versehen, wie die Fühlerbasalglieder bräunlich-schwärzlich gefärbt und mit weisser Spitze endigend.

Die Ruder (Fig. 41) sind ohne Borsten etwa halb so lang wie der Körper breit ist, mit den Ventralborsten etwa ¾ so lang. Der dorsale Ruderast ist kurz und erreicht mit den Borsten nicht die Austrittsstelle der Ventralborsten; der etwa doppelt so hohe wie breite Ventralast trägt einen Fächer starker Borsten, die etwa so weit reichen wie der

Dorsalcirrus. Die Dorsalcirren sind an der Wurzel bräunlich, übrigens weiss gefärbt und tragen etwas distalwärts von ihrer Mitte einen schwarzen Pigmentring. Der fadenförmige Ventralcirrus ist etwa halb so lang wie der ventrale Ruderast.

Die Dorsalborsten (Fig. 43) sind in geringer Zahl vorhanden und bilden ein kurzes Bündel. Die Ventralborsten (Fig. 44) sind etwas gebogen, unterhalb der zweizähnigen Spitze wenig verbreitert und hier mit Querreihen von Dörnchen versehen. Zwei Analcirren von der Färbung der Rückencirren und der Länge der 5 letzten Segmente finden sich am Körperende.

Die Elytren (Fig. 42) finden sich in 18 Paaren nach der bei Halosydna bekannten Stellung: 2, 4, 5, 7, . . . 21, 23, 25, 27, 28, 30, 31, 33.

Die Elytren sind nierenförmig begrenzt, am Rande ungefranzt, auf der Oberfläche für das blosse Auge glatt und auf gelblichgrauem Grunde durch braune bis schwärzliche Flecken gewölkt, am Hinter- und Seitenrande schmal braun gesäumt (mehr oder minder regelmässig und continuierlich). Die Unterseite der Elytren zeigt ebenfalls eine braune Wölkung, namentlich im Umkreise des Elytrenansatzes einen unregelmässigen zusammenhängenden Fleck. Die Papillen der Elytrenoberfläche sind nur mit Vergrösserungen erkennbar und haben die Form zerstreuter kleiner kegelförmiger Erhebungen, welche dort, wo sie in den Pigmentflecken vorkommen, ein ähnliches Bild zeigen wie bei *Polynoë brevisetosa* Kinberg[1] (die grossen Oberflächenpapillen der *Polynoë brevisetosa* fehlen hier). Ausser den zerstreuten Papillen findet sich noch dicht am concaven Vorderrand der Elytren und an den Seitenrändern derselben noch hinaufreichend, dem Rande parallel laufend, ein schmaler Streifen von zu 2 bis 3 übereinanderstehenden hellen kegelförmigen Papillen, welche etwas grösser sind als die der übrigen Elytronoberfläche.

Über die zur Halosydna-Gruppe gehörenden Polynoiden der pacifischen Küste Amerikas ist noch zu erwähnen, dass das mir vorliegende Tier weder zu *Polynoë brevisetosa* noch P. *reticulata* H. P. Johnson von Californien gehört; nahe verwandt zu sein scheint *Halosydna parva* Kinberg von Peru, hat aber gefranzte Elytren; *Halosydna leucohyba* Webster (*granulata* Ehlers) aus dem Floridagebiet hat zwar glatte Elytren, hat jedoch in der Ausstattung der Elytronoberfläche mit Papillen ziemliche Ähnlichkeit mit *Polynoë brevisetosa* Kinberg.

Durch die Liebenswürdigkeit von Herrn Professor Levinsen in Kopenhagen, welchen ich um Übersendung zwecks eigener Anschauung der von Grube beschriebenen Arten der Halosydna-Gruppe[1] bat, da ich vermutete, das mir vorliegende Exemplar möchte einer dieser Arten angehören, bin ich in der Lage, an dieser Stelle noch einige Bemerkungen über die *Halosydna* (*Polynoë*) *clavata* Grube Kr. Taf. 3, Fig. 45–47 hier anzufügen zur Ergänzung der Grube'schen Beschreibung.

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[1] H. P. Johnson, Proc. Cal. Acad. Sci., 1897, ser. 3, vol. 1, p. 167, Plate 7, Fig. 40 a.

Nach brieflicher Mitteilung von Professor Levinsen sind die Originale von *Polynoë fuscomarmorata* und *P. marginata* (Grube's Übersicht der Polynoëen, *loc. cit.*, p. 42) nicht in Kopenhagen und anscheinend nicht mehr vorhanden, während *Polynoë mülleri* mit *Polynoë clavata* Grube Kr. zusammenfällt. Aus dem Originalzettel des Gefässes, in dem sich *Polynoë clavata* befand, geht hervor, dass diese von Callao an der pacifisch-amerikanischen Küste stammt, während Grube diese Art irrtümlich von St. Croix in Westindien angiebt.[2]

Das mir vorliegende Exemplar der *P. fuscomarmorata* aus Payta gehört nicht zu *Polynoë clavata* Grube Kr. *Polynoë clavata* hat einerseits in den Borsten Ähnlichkeit mit *Polynoë fuscomarmorata*, in der Gestaltung der Elytren andererseits mit *Polynoë brevisetosa* Kinb.

Polynoë clavata hat 37 Segmente und 18 Paar Elytren, welche in derselben Weise wie bei *P. fuscomarmorata* angeordnet sind und den Rücken des Tieres grade eben bedecken. Die Elytren (Fig. 45) sind nierenförmig, am convexen Rande schwach und kurz gefranzt und auf der Oberfläche, namentlich auf dem der Rückenmediane des Tieres zugekehrten Teil bräunlich oder schwärzlich gewölkt; in der Gestalt, Grösse und Anordnung der Papillen der Elytrenoberfläche ähnelt *P. clavata* der *P. granulata* Ehlers und mehr noch wohl der *Polynoë brevisetosa* Kinberg.

In der Form der Borsten ähnelt *P. clavata* ziemlich stark der *P. fuscomarmorata*; die Mehrzahl der Dorsalborsten (die längeren) gleichen denen der *P. fuscomarmorata*, daneben finden sich in geringer Zahl kurze Dorsalborsten (Fig. 46) mit schwach hakiger Spitze. Die ventralen Borsten (Fig. 47) sind am Ende zweizähnig und ähnlich wie bei *P. fuscomarmorata* gestaltet, weichen aber von denen der *P. brevisetosa* ab. *Polynoë clavata* mag danach eine in verschiedener Richtung vermittelnde Stellung zu *P. brevisetosa* einerseits wie zu *P. fuscomarmorata* andererseits, und auch zu der *P. granulata* Ehlers aus Westindien in mehrfacher Beziehung einnehmen.

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[1] Grube, Annulata Oerstediana. Vidensk. Meddel. Kjöbenhavn, 1856.

[2] *Ibid.*, p. 47.

Polynoëlla pachylepis, sp. nov.

Taf. 3, Fig. 48–52.

Ein paar recht schlecht erhaltene Exemplare vertreten diese Art, welche in ihrem Habitus offenbar der *Polynoëlla laevisetosa* McIntosh[1] gleicht, sich von der letzteren jedoch durch das Vorkommen von zwei verschiedenen Borstenformen im ventralen Ruderast unterscheidet.

Das noch am besten erhaltene Exemplar, an welchem der Rüssel ausgestülpt war, ist der folgenden Beschreibung zu Grunde gelegt worden.

Die Körperform des Tieres ist kurz, dabei gestreckt eiförmig, der Körper mit dem Rüssel ca. 3,4 cm., ohne den letzteren etwa 2,9 cm. lang und besteht aus 39 Segmenten (die Zahl der Segmente scheint trotz der schlechten Erhaltung des Tieres und seines Hinterendes vollständig zu sein).

Die Rückenfläche des Körpers wird von den Elytren, welche fast alle verloren gegangen sind, wahrscheinlich vollständig bedeckt (?). Der Körper der Tiere hat eine graugelbliche Färbung, ist an der Ventralseite, und an den Lippen des ventralen Ruderastes dunkelbläulich angelaufen und mag mit den Borsten etwa 2½mal länger als breit sein. Die grösste Körperbreite liegt etwa an der Grenze des vorderen und mittleren Körperdrittels, wo die Segmente ungefähr 5mal, mit den Rudern etwa 8mal breiter als lang sind.

Der Kopflappen (Fig. 48) ist ausgesprochen querbreiter, annähernd sechseckig umrissen, etwa 2½mal breiter als lang und am Hinterrande ein wenig concav. Eine Längsmedianfurche, in welcher vorn das Basalglied des verloren gegangenen Mittelfühlers inseriert ist, teilt den Kopflappen in zwei Seitenhälften, von denen jede ein Paar grosser, mit Linsen versehener dunkler Augen trägt; die Augen, von welchen die vorderen etwa doppelt so gross als die hinteren sind, nehmen die 4 Hinterecken des Kopflappensechsecks ein und sind ziemlich weit von einander getrennt.

Von den drei in gleicher Höhe vorn am Kopflappen entspringenden Fühlern sind die beiden seitlichen Fühler kurz, spitz-kegelförmig und haben ein ebensolanges, starkes kegelförmiges Basalglied, welches etwa doppelt so lang wie dasjenige des Mittelfühlers ist. Die paarigen Fühler sind mit ihrem Basalglied ungefähr so lang wie der Kopflappen und tragen unterhalb ihrer Spitze einen dunklen Pigmentring. Die Palpen sind wie die Fühler und Cirren glatt, kräftig gestreckt-kegelförmig, reichen etwa so weit wie die Fühlercirren nach vorn und tragen unterhalb der Spitze ebenfalls einen dunklen Pigmentring.

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[1] McIntosh, Challenger Reports, 1885, vol. 12. Annelida, p. 128.

Die Begrenzung der Mundöffnung wird ventral durch ein bei ausgestülptem Rüssel verkehrt flach-dreieckiges Mundpolster gebildet, welches seitlich vom 1sten und 2ten, hinten vom 3ten Segment begrenzt wird. Der ausgestülpte Rüssel trägt an seinem Ende die quere Mundöffnung, welche mit einem oberen und unteren Paar brauner, mit ihren Spitzen divergierender Kiefer bewaffnet und von 18 bis 20 grossen, dreieckig-blattartigen Papillen umgeben wird. Rechts und links seitlich am Rüssel etwas hinter dem terminalen Papillenkranz findet sich noch ein Paar dreieckiger, dick blattartiger Papillen, die, übereinander stehend, zusammen etwa die Form eines Karpfenschwanzes haben.

Am 1sten Ruder, welches nur eine Acicula enthält ohne Borsten, ist von den Buccalcirren nur ein ventraler erhalten, welcher fadenförmig und etwa 1½mal so lang wie sein Ruder ist. Das 2te Ruder ist im wesentlichen wie die folgenden gebildet, nur ist sein Ventralcirrus stärker und doppelt so lang wie das Ruder.

Die mittleren Ruder (Fig. 50) selbst sind seitlich compress, etwa doppelt so hoch wie breit, ungefähr so lang wie der Körper breit ist und bestehen eigentlich nur aus dem Ventralast, an welchem der dorsale Ast als ein kegelförmiger Höcker erscheint. Der Ventralcirrus ist kurz, fadenförmig, in der Mitte dunkel pigmentiert, und nimmt etwa an Länge das äussere Viertel des ventralen Ruderastes ein und reicht bis an die Basis der Ruderlippen. Der ventrale Ruderast trägt am Ende eine vordere und hintere fleischige, abgerundete, blattartige Lippe, welche die Borsten umschliessen. Der dorsale Ruderast entspringt ungefähr halbwegs zwischen dem Basalhöcker des Rückencirrus und der Lippenbasis als ein kegelförmiger Höcker, der nur eine Acicula, doch keine Borsten enthält. Der Dorsalcirrus ist stark, fadenförmig, entspringt etwa auf halber Ruderlänge mit einem dicken kegelförmigen Basalhöcker, der bis an die Basis der Ruderlippen reicht, und ist etwa so lang wie die ventralen Borsten; unterhalb der Endspitze trägt der Dorsalcirrus einen dunklen Pigmentring (hier wie anderwärts nicht mit eingezeichnet).

Die Borsten des ventralen Ruderastes sind gering an Zahl und treten in 2 verschiedenen Formen auf. Dorsal von der ventralen Acicula finden sich 5 schwächere kürzere Borsten (Fig. 51), welche in ihrem Endabschnitt lang lanzenartig ausgezogen sind; die Endspitze trägt auf einer Seite eine nicht bedeutende Zahl von spitzigen Sägezähnchen. Unterhalb der Acicula im ventralen Ruderast kommen nur 1 bis 2 stärkere und längere Borsten vor (Fig. 52); dieselben sind ganz glatt, seitlich stark zusammengedrückt, in ihrem Endteil etwas dreieckig verbreitert mit ganz schwach gebogener Endspitze.

Die Elytren (Fig. 50) haben eine ausgesprochen nierenförmige Peripherie, sind etwas fleischig von Consistenz und am Rande wie auf der Oberfläche vollkommen glatt; auf ihrer Oberfläche zeigt sich bei starker Vergrösserung eine netzartige Zeichnung, welche einerseits vielleicht durch die Zellgrenzen, andererseits auch dadurch hervorgerufen wird, dass an der Oberfläche der Elytren punktförmiges dunkles Pigment in Kreisen oder Maschen abgelagert ist; die vermutlichen Zellmaschen umschliessen wieder glänzende ovale Körperchen (Kerne ?). Die Stellung der Elytren (bei der schlechten Erhaltung des Tieres schwierig zu erkennen), ist wahrscheinlich die folgende: 2, 4, 5, 7, . . . 21, 23, 26, 29, 32, 35, 36, woraus das Vorhandensein von 17 Elytrenpaaren resultieren würde. Von der *Polynoëlla lævisetosa* des "Challenger" werden bei geringerer Segmentzahl 12 Paar Elytren angegeben. Analcirren, die offenbar dem Tier zukommen, waren nicht mehr erkennbar.

Fundort:

Nr. 303.	Depth 306 fms.	Lat. 41° 34′ 30″ N.	Long. 65° 54′ 30″ W.
Nr. 326.	Depth 464 fms.	Lat. 33° 42′ 15″ N.	Long. 76° 00′ 50″ W.
Nr. 309.	Depth 304 fms.	Lat. 40° 11′ 40″ N.	Long. 68 22′ W.

Alentia gelatinosa Sars. Malmgren.

Von dieser Art findet sich ein einziges Exemplar vor, welches aus einem getrennten Vorder- und Hinterstück besteht, die zusammen ca. 6 cm. lang sind und ein vollständiges Tier zu repraesentieren scheinen. Das Exemplar hat 42 Segmente und 17 Paare von Elytren, welche hinten am 23, 26, 29, 32, 35, 36sten Segment stehen. Für die Art werden sonst 18 Elytrenpaare angegeben,[1] sodass bei meinem Exemplar vielleicht doch infolge des Zerbrechens einige Segmente ausgefallen sind. Bei im Übrigen vollständiger Übereinstimmung des westindischen Exemplares mit nördlichen Exemplaren der Art unterscheiden sich die kleinen Elytrenpapillen ein wenig von denen der letzteren. Die Papillen sind von den Seiten abgeplattet und erscheinen, von unten nach oben sich verschmälernd, als Ganzes keilförmig, im Profil etwas glockenförmig; die schneidenartig schmale

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[1] McIntosh, Monogr. British Annelids, 1900, part 2, p. 387.

Endfläche der Papillen zeigt am Rande hier und da ganz feine Einkerbungen ohne in drei Zähne ausgezogen zu sein wie bei europäischen Tieren und ist am Ende etwas convex begrenzt.

Fundort:
Nr. 297. Depth 123 fms.
Lat. Barbados N.
Long. " W.

Admetella longipedata McIntosh.

Challenger Reports, 1885, Vol. 12. Annelida, p. 124, Plates **12a**, **14**, **20**.

Diese aus den Anneliden des Challenger beschriebene Art liegt mir in einem westindischen Exemplar vor, welches bei einer Länge von 6,5 cm. 61 oder 62 Segmente enthält und in seiner Segmentzahl wohl vollständig erhalten ist. Wie an den Exemplaren des Challenger, für welche von McIntosh (*loc. cit.*) etwa 24 Paare von Elytren ohne Angabe ihrer Stellung am Körper angeführt werden, sind bei dem vorliegenden Exemplar sämtliche Elytren verloren gegangen. Nach den Elytrenträgern der Segmente ergiebt sich folgende Elytrenstellung: 2, 4, 5, 7, . . . 21, 23, 26, 29, . . . 50, 53, 56, 58, 59. Die Elytren stehen danach bis zum 23ten Segment wie bei anderen Polynoiden, treten von da an immer mit Überschlagung zweier Cirrenruder auf und lassen dann am 56ten und 58ten Segment nur ein Cirrenruder zwischen sich. Es sind danach für das westindische Exemplar wohl 25 Elytrenpaare anzunehmen. Nach der Beschaffenheit des 59ten Ruders hat dort wahrscheinlich ein Elytron gestanden, möglicherweise auch noch am 60ten Segment, wenn man aus der Form des ähnlich wie die vorhergehenden Elytrenträger gestalteten Fortsatzes schliessen darf.

Über die Segmente des Mittelkörpers ist noch zu sagen, dass dieselben ohne Ruder etwa 4mal, mit den Rudern 12- bis 13mal breiter als lang sind; das ventrale Borstenbündel ist etwa $\frac{3}{4}$ so lang wie das Ruder.

McIntosh giebt den dorsalen Ruderast als borstenlos an. An dem vorliegenden Exemplar, an welchem an manchen Rudern auch die Dorsalborsten verloren gegangen sind, findet sich an den am besten erhaltenen Rudern im dorsalen Ruderast ein Borstenbündel, das aus einer geringen Anzahl zarter, haarartig biegsamer, feiner Borsten besteht; die längsten dieser Borsten erreichen die Länge des ventralen Borstenbündels, sind aber schmäler und zarter als die Ventralborsten und am Ende einspitzig. Die Endpartie der Dorsalborsten ist sehr schwach lanzettlich verbreitert und an der einen Kante und an den Flanken hinaufziehend mit ganz feinen Querleisten versehen, durch welche das Kantenprofil eine sehr fein gesägte Begrenzung erhält.

Ob die Ventralborsten am Ende wirklich so gestaltet sind, wie sie von McIntosh (*loc. cit.*, Plate **12**, *A*, Fig. 17) abgebildet sind, erscheint mir nicht ganz sicher, da es bei der zarten Beschaffenheit der Borsten, welche offenbar vielfach am Ende abgenutzt und ausserdem durch Faltungen und Umrollungen ihrer Ränder deformiert sind, ziemlich schwierig ist, die Form zu erkennen. Die Ventralborsten mögen entweder einspitzig sein (wenn man sich die eine der Spitzen in McIntosh's Figur wegdenkt) oder noch eine kurze Nebenspitze nach Art anderer Polynoëen besitzen (?).

Das Fehlen der Augen am Kopflappen ist wohl noch nicht als ausgemacht zu denken, da sich bei dem westindischen Exemplar etwas dunkler gefärbte, ein wenig vorgewölbte Partien jederseits am Kopflappen erkennen lassen, welche als verblichene grosse Augen angesprochen werden könnten.

Was endlich die merkwürdigen Lappen an der Basis des unpaaren Kopffühlers betrifft, welche mit den Anhängseln an der Fühlerbasis der Sigalioniden (McIntosh, *loc. cit.*, p. 124) in Beziehung gebracht werden, so mag es mir hier gestattet sein, meine Zweifel an der Deutung dieser Lappen als normale Bildungen auszusprechen. Obgleich diese Lappen sich auch an dem westindischen Exemplar vorfinden, bei welchem der Kopflappen in unnatürlicher Weise etwas nach hinten hinüber gedrückt ist, kommen mir diese Lappen nicht als normale Bildungen vor, sondern als beim Hinüberdrücken des Kopflappens nach hinten an beiden Seiten abgerissene Hautpartien. Dass die wenigen bekannten Exemplare der Art beim Fange stark gelitten haben, wie sich aus dem Verlust sehr vieler Borsten und aller Elytren ergiebt, dürfte vielleicht mit ins Gewicht fallen für meine Deutung der Hautlappen am Kopflappen der Admetella.

Eine entfernte Ähnlichkeit der Admetella mit Alentia gelatinosa spricht sich in der Gestaltung der an den Kopflappen anstossenden Rückenpartie aus, welche ungefähr ein Aussehen hat, wie es Alentia zeigen würde, wenn man sich deren blattförmigen Nuchallappen entfernt denkt. Nach der Beschaffenheit der Borsten ist vielleicht auch Admetella wie Alentia eine schwimmfähige Form.

Fundort:

Nr. 260. Depth 291 fms.
Lat. Grenada N.
Long. " W.

Lagisca floccosa Sav. (**propinqua** Malmgr.) **unidentata**, var. nov.

Ein einziges nicht besonders erhaltenes Exemplar von ca. 1,7 cm. Länge, mit 42 Segmenten und 15 Elytrenpaaren habe ich als Varietät der europäischen Lagisca floccosa angesprochen, von der es in der Form der Borsten etwas abweicht. Die Färbung des Tieres ist graugelblich, auf der Dorsalseite der Segmente findet sich eine breite dunklere Querbinde, die in der Rückenmediane meist unterbrochen ist. Die wenigen erhaltenen Elytren zeigen eine unregelmässige dunkelbraune Wölkung, welche durch grössere helle Partien, namentlich in der Längsachse des Elytrons unterbrochen ist. Bezüglich der Oberflächenpapillen der Elytren gleicht das Tier sehr der von McIntosh[1] angeführten Varietät von der "Porcupine;" unter drei Elytren fanden sich auf einem nur eine, auf einem andern zwei, auf den dritten gar keine der grossen keulenförmigen Papillen am Hinterrande. Von den Borsten sind die dorsalen etwas schlanker und mit etwas längerer dünnerer glatter Endspitze versehen als bei der Stammform. Die ventralen Borsten sind durchweg am Ende einspitzig, doch hat man von einigen den Eindruck, als ob hier durch Abnutzung vielleicht eine kleinere Nebenspitze verloren gegangen sein könnte. Da bei der typischen *Lagisca floccosa* ein Teil der Ventralborsten zu unterst im ventralen Ruderast die ohnehin kleine Nebenspitze nicht mehr besitzt, betrachte ich das westindische Exemplar als eine Varietät, bei welcher sich die Einspitzigkeit der Ventralborsten auf alle diese Borsten erstreckt.

Fundort:
Nr. 347. Depth 24 fms.
Lat. 40° 59′ N.
Long. 71° 22′ 30″ W.

Antinoë finmarchica Malmgren (?).

Von dieser Art fanden sich verschiedene vordere und hintere Bruchstücke vor, darunter zwei Fragmente mit erhaltenem Kopflappen. Das grössere der beiden Vorderstücke enthält 33 Segmente, ist ca. 1,2 cm. lang bei einer Körperbreite mit Borsten von ca. 0,6 cm. Schätzungsweise mag dies Exemplar etwa 40 Segmente bei vollständiger Erhaltung gezählt haben, die Segmentzahl würde danach grösser sein als sie für europäische Tiere der Art angegeben wird.[2] Die wenigen erhaltenen Elytren haben grosse Ähnlichkeit mit der Abbildung, welche

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[1] McIntosh, Monogr. British Annelids, 1900, part 2, p. 302, Plate **32**, Fig. 9.

[2] Malmgren, Annulata Polychaeta. Helsingfors, 1867, p. 13.

McIntosh[1] von diesen Organen gegeben hat; die Borsten stimmen in ihrer Form ebenfalls mit den dort[3] gegebenen Abbildungen überein.

Fundort:
Nr. 266. Depth 461 fms.
Lat. Grenada N.
Long. " W.

Nemidia antillicola, sp. nov.

Taf. **3**, Fig. 53–59.

Die vorliegende Art ist durch eine kleinere Zahl von Exemplaren von zwei Fundorten vertreten und hat einen mässig langen, aber gestreckten Körperbau und gleicht in ihrem Habitus der nordischen *Nemidia torelli.*[2] Der gelblich gefärbte Körper der Tiere trägt 15 Paare von Elytren, welche die Rückenfläche kaum bedecken an den Seiten des Körpers nur wenig auf die Ruder hinaufreichen und eine beträchtliche Strecke der hinteren Körperhälfte vollkommen unbedeckt lassen. Eines der grössten Exemplare hat eine Länge von ca. 4,8 cm. bei einer Zahl von 57 Segmenten, eine grösste Körperbreite von ungefähr 1,1 cm. mit den Borsten und die Elytren nach der Stellung: 2, 4, 5, 7, . . . 21, 23, 26, 29, 32, so dass einige 20 hintere Segmente keine Elytren tragen. Ein kleineres Exemplar mit ausgestülptem Rüssel hat mit dem Rüssel eine Länge von 2 cm., ohne den Rüssel von 1,6 cm. und dabei 38 Segmente mit 13 Elytrenpaaren nach der Stellung: 2, 4, 5, 7, . . . 21, 23, 26.

Die Körperform dieser Art ist ziemlich parallelseitig. Der Körper erreicht seine grösste Breite, von vorn her zunehmend etwa an der hinteren Grenze des 1ten Längendrittels ungefähr in der Gegend des 12ten bis 15ten Segments und nimmt dann nach hinten zu ganz allmählich an Breite ab bis zum Ende. Das schon erwähnte grosse Exemplar liegt der weiter folgenden Beschreibung zu Grunde. Der Kopflappen (Fig. 53) ist querbreiter, etwa quer-oval oder quer-sechseckig, etwa zweimal breiter als lang und wird durch eine deutliche Längsmedianfurche in zwei Seitenhälften geteilt. Der Kopflappen endigt vorn über den Wurzeln der paarigen Fühler je in eine scharfe kegelförmige Spitze und trägt jederseits ein Paar dunkler Augenflecke, von denen die vorderen doppelt so gross sind wie die hinteren, und welche die vier hinteren Ecken des Kopflappensechsecks einnehmen.

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[1] McIntosh, Monogr. British Annelids, 1900, part 2, p. 368, Plate **33**, Fig. 8.

[2] Malmgren, Nordiska Hafs-Annulater. Ofv. k. vet. Akad. Förh., Stockholm, 1865, p. 84, Taf. **13**.

Die Fühler sind einfach fadenförmig, und der unpaare Mittelfühler, dessen Basalglied kaum halb so lang wie der Kopflappen und doppelt so breit ist wie das Basalglied der Seitenfühler, ist 3- bis 4mal länger als der Kopflappen und doppelt so lang wie die unter ihm inserierten paarigen Fühler. Die Palpen sind langgestreckt kegelförmig, wie die Kopffühler und Cirren glatt, übertreffen die paarigen Fühler fast um deren Länge, ohne so weit zu reichen wie der Mittelfühler. Die Mundöffnung wird von unten her begrenzt durch das quadratische bis rechteckige Mundpolster, welches seitwärts an das 1te bis 3te, hinten an das 4te Segment anstösst. Bei ausgestülptem Rüssel stellt sich die Rüsselmundung als quere oben und unten von je 9 blattförmig-dreieckigen Papillen umrahmte und mit zwei braunen Kieferpaaren bewaffnete Spalte dar. Die normalen mittleren Körpersegmente, welche auf ihrer Dorsalseite durch ganz flache längliche Hautverdickungen (Fig. 59) ein etwas rauhes und punktiertes Aussehen erhalten, sind in der Gegend der grössten Körperbreite etwa 5mal, in der hinteren Körperhälfte etwa 3mal breiter als lang ohne Ruder. Das 1ste Ruder trägt 2 fadenförmige Buccalcirren, von denen der dorsale etwa 4½mal, der ventrale etwa 4mal länger als das Ruder ist und enthält nur eine Acicula (sehr wahrscheinlich keine Borsten). Die zweiästigen mittleren Ruder (Fig. 54) sind ungefähr zweimal höher als breit und in der vorderen Körperhälfte etwa halb so lang, in der hinteren Körperhälfte etwa 1½ mal so lang wie der Körper breit ist. Beide Ruderäste endigen in eine scharfe kegelförmige Spitze, welche die Acicula enthält. Der viel schwächere dorsale Ast reicht mit seiner Endspitze bis an die Basis der ventralen Borsten. Von den fadenförmigen Cirren der Ruder ist der Dorsalcirrus ziemlich lang und reicht, mit kegelförmiger Basis entspringend, mindestens doppelt so weit seitwärts wie die ventralen Borsten. Der Ventralcirrus entspringt etwas distalwärts von der Mitte der ventralen Ruderastlänge und reicht, das Ruder überragend, ungefähr halb so weit wie die ventralen Borsten; am 2ten Ruder ist der Ventralcirrus beträchtlich länger als an den folgenden Rudern und ungefähr 2½mal so lang wie sein Ruder. Die Spitze des ventralen Ruderastes trägt über dem Borstenbündel einen zarten fadenförmigen Fortsatz.

Die Elytren (Fig. 55), dem blossen Auge glatt erscheinend, welche die Rückenfläche der Tiere etwa bis zur gegenseitigen Berührung und weiter hinten unvollständiger als vorn bedecken, sind ausgesprochen kurz eiförmig gestaltet, die vordersten nähern sich mehr der Kreisform, und tragen an der Peripherie keine Fransen; auf der Elytrenoberfläche finden sich zahlreiche, zerstreute, kurz- und stumpf-kegelförmig gestaltete, gelbliche Papillen (Fig. 58), und in weit geringerer Zahl zerstreute cylindrische Fadenpapillen. Die Elytren sind ziemlich zart und auf ihrer Oberseite weisslich mit schwacher Irisation. Auf der Dorsalseite aller Ruder, ein wenig distalwärts vom Elytrophor erkennt man eine quergerichtete, spaltartige Vertiefung.

Die Borsten sind in beiden Ruderästen einspitzig; die kürzeren Dorsalborsten (Fig. 56), welche etwa halb so weit seitlich hervorragen wie die ventralen, treten in geringerer Zahl zu 6 bis 9 auf und bilden ein kegelförmig auseinander gespreiztes Bündel. Die Dorsalborsten sind grade, an der Spitze nur sehr wenig gebogen und tragen in ihrer Endhälfte Querreihen von Sägezähnchen. Die Ventralborsten sind in ihrem Enddrittel etwa deutlich verbreitert und am Ende merklich gebogen, übrigens in dieser Gegend wie die Dorsalborsten mit Querreihen von Sägezähnchen versehen, welche vor der glatten Endspitze wieder verschwinden (Fig. 57).

Das hintere Ende der Tiere trägt zwei fadenförmige Analcirren, welche so lang sind wie die 12 letzten Segmente.

Die vorliegende Art unterscheidet sich von *Nemidia torelli* Malmgren (*loc. cit.*) durch die Form der Borsten wie den Papillenbesatz der Elytren, ob auch in der Bildung des Kopflappens, lässt sich allein aus Malmgren's Beschreibung nicht feststellen. Die nordamerikanischen Arten der Gattung, *Nemidia canadensis* und *N. lawrencei* McIntosh[1] unterscheiden sich ebenfalls durch glatte Elytren von der westindischen Art.

Fundort:

Nr. 307.	Depth 980 fms. Lat. 41° 29′ 45″ N. Long. 65° 47′ 10″ W.	Nr. 309.	Depth 304 fms. Lat. 40° 11′ 40″ N. Long. 63° 22′ W.

Eulepis splendida Treadwell.

Polychaetous Annelids of Porto Rico, 1902, p. 189.

Diese Art war in einem einzigen Exemplar vorhanden, welches mitten durchgebrochen, doch wohl vollständig erhalten war. Das Tier enthält 37 oder 38 Segmente und stimmt gut mit der Beschreibung von Treadwell überein, und hat eine Länge von ca. 2,9 cm. insgesammt. Die Elytren entsprechen in ihrer Verteilung den Angaben Treadwell's im Gegensatz zu McIntosh,[2] welcher das dritte Ruder bei *Eulepis wyvillei* (*loc. cit.*, p. 133) als elytrentragend angiebt; die letztere Angabe wird dadurch erklärlich, dass das 3te Ruder etwas zwischen das 2te und 4te

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[1] McIntosh; Ann. Mag. Nat. Hist., 1874, ser. 4, vol. 13, p. 265, 266.

[2] McIntosh, Challenger Reports, 1885, vol. 12. Annelida, p. 132.

Ruder eingekeilt ist und so scheinbar ein Elytron trägt. Auch bei dem vorliegenden Exemplar tritt hinter dem 12ten Elytrenpaar kein Elytron mehr auf. Bezüglich der Borsten lässt sich noch hinzufügen, dass zu oberst im ventralen Borstenfächer eine einzelne mit langen gegen die Spitze kleiner werdenden Kammzähnen besetzte Borste vorkommt, wie sie für *Eulepis wyrillei* (*loc. cit.*, p. 133) angegeben wird, so dass bei der vorliegenden Art ebenfalls in jedem Ruderast zwei verschiedene Borstenformen vorkommen.

Eulepis splendida fällt möglicherweise mit *E. wyrillei*, die ebenfalls aus Westindien stammt, zusammen.

Fundort:
Nr. 247. Depth 170 fms.
Lat. Grenada N.
Long. " W.

Zu den Polynoidae gehörige Formen, welche wegen zu schlechter Erhaltung nicht weiter berücksichtigt wurden, lagen noch vor von

Fundort:

Nr. 231. Depth 1591 fms.
Lat. Off Beguia N.
Long. " W.

Nr. 148. Depth 208 fms.
Lat. St. Kitts N.
Long. " W.

Nr. 221. Depth 423 fms.
Lat. Sta. Lucia N.
Long. " W.

Nr. 311. Depth 143 fms.
Lat. 39° 59′ 30″ N.
Long. 70° 12″ W.

Nr. 146. Depth 245 fms.
Lat. St. Kitts N.
Long. " W.

Nr. 204. Depth 476 fms.
Lat. Martinique N.
Long. " W.

EUNICIDAE.

Eunice violaceo-maculata Ehlers.

Die Art ist vertreten durch zwei Bruchstücke, davon eines mit Kopf, welche mit der Beschreibung von Ehlers[1] übereinstimmten.

Fundort:
Nr. 132. Depth 115 fms.
Lat. Sta. Cruz N.
Long. " W.

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[1] Ehlers, Florida-Anneliden, 1887, p. 86.

Eunice tibiana Pourtalès (Ehlers).

Fundort:

Nr. ——. Depth 270 fms.
Off Havanna.

Nr. 600. Depth $\frac{250}{400}$ fms.
Lat. Off Morro Castle N.
Long. " W.

Nr. 101. Depth $\frac{175}{250}$ fms.
Off Morro Light.

Nr. 238. Depth 127 fms.
Lat. Grenadines N.
Long. " W.

Eunice floridana Pourtalès (Ehlers).

Es liegen von dieser Art nur wenige hinten verstümmelte Tiere vor. Die Schneiden des Unterkiefers stellen sich bei guter Erhaltung an ihrem Rande dreizähnig und schräg abgeschnitten dar. (Vergl. Ehlers, Florida-Anneliden, 1887, Taf. **22**, fig. 6.)

Fundort:

Nr. 288. Depth 399 fms.
Lat. Barbados N.
Long. " W.

Nr. 171. Depth 183 fms.
Lat. Guadeloupe N.
Long. " W.

Nr. 116. Depth 150 fms.
Lat. 17° 55″ N.
Long. 76° 41′ 20″ W.

Eunice articulata Ehlers.

In der Beschreibung dieser Art[1] werden für die stärkst entwickelten Kiemen 13 Kiemenstrahlen angegeben, während bei einem in der Göttinger Sammlung aufbewahrten Originalexemplar höchstens 5 Kiemenstrahlen vorkommen. Die wenigen mir vorliegenden Tiere stehen in ihrer Kiemenentwicklung zwischen den angeführten Extremen, indem bei einem hinten verstümmelten Exemplar bis 7 Kiemenstrahlen, bei einem vollständigen Exemplar von 92 Segmenten bis 10 Kiemenstrahlen vorkommen. An den vorliegenden Tieren (bei dem vollständigen Exemplar stehen Kiemen am 3ten bis 43ten Ruder) sind die Kiemen kammförmig gestaltet und ihre Strahlen kaum kürzer als der Dorsalcirrus und weichen darin etwas ab von dem Göttinger Exemplar, an welchem der Dorsalcirrus länger als die Kiemenstrahlen ist und die Kiemen nicht so sehr kammförmig als vielmehr handförmig erscheinen (Folge eines anderen Erhaltungszustandes). Trotz der kleinen Abweichungen glaube ich die vorliegenden Tiere zu *E. articulata* stellen zu müssen. Über den Ventralcirrus der mittleren Ruder ist noch zu bemerken, dass derselbe wie bei *E. binominata* Quatrefages hier ziemlich lang kegelförmig gestreckt erscheint und das Ruder weit überragt.

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[1] Ehlers, Florida-Anneliden, 1887, p. 83.

Fundort:

Nr. 303.	Depth 306 fms.	Lat. 41° 34′ 30″ N.	Long. 65° 54′ 30″ W.
Nr. 326.	Depth 464 fms.	Lat. 33° 42′ 15″ N.	Long. 76° 00′ 50″ W.

Eunice antillensis Ehlers.

Taf. **4**, fig. 64, 65.

Über die wenigen dieser Art zuzurechnenden Exemplare mögen hier noch einige Bemerkungen vorgebracht werden. Bei einem vollständigen Exemplar von 110 Segmenten nehmen die Kiemen die Strecke vom 3ten bis 65ten Ruder ein. Bei einem im Göttinger Museum aufbewahrten Exemplar ohne hintere Körperstrecke findet sich noch am letzten erhaltenen (67ten) Segment ein kurzer Kiemenfaden. Die hintere Kiemengrenze ist danach, da in der Beschreibung der Art[1] die letzte Kieme am 40ten Ruder steht, ziemlich bedeutenden Schwankungen unterworfen. Dass die hintere Kiemengrenze noch weiter nach hinten verschoben sein kann als eben angegeben wurde, zeigt ein Exemplar einer Eunice, welches trotz einiger kleiner Abweichungen doch wohl zu *Eunice antillensis* zu stellen ist. Dies Exemplar (von Nr. 220) trägt bei dem Fehlen der hinteren Körperstrecke an den vorhandenen 97 Rudersegmenten noch Kiemenfäden am 80ten Ruder und es würde die hintere Kiemengrenze der vorliegenden Art, durch Übergänge verbunden, vom 40ten bis 80ten Ruder sich einstellen können. Das Exemplar von Nr. 220 ist ferner noch bemerkenswert durch die Gestalt seiner Unterkieferschneiden, welche durch ihre langgestreckte Form wohl zufolge besserer Erhaltung von der sonst beobachteten Form der Schneiden sich unterscheiden. Man vergleiche hierzu den Unterkiefer des Exemplares von Nr. 220 (Taf. **4**, fig. 65) und den der gewöhnlich beobachteten Form bei *Eunice antillensis* (Taf. **4**, fig. 64).

Fundort:

Nr. 203.	Depth 96 fms.	Lat. Martinique N.	Long. " W.
Nr. 276.	Depth 94 fms.	Lat. Barbados N.	Long. " W.
Nr. 220.	Depth 116 fms.	Lat. Sta. Lucia N.	Long. " W.

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[1] Ehlers, Florida-Anneliden, 1887, p. 84.

Eunice binominata Quatrefages.

Taf. 4, Fig. 60–63.

Es liegen mir nur wenige bis auf eines hinten verstümmelte Exemplare einer Eunice vor, welche nach der Verteilung ihrer Kiemen offenbar zu dieser Art gehören. Es sind im Anschluss an einige Abweichungen der vorliegenden Tiere noch einige Bemerkungen über diese Art zu machen. Die vorliegenden Tiere weichen durch längere Fühler und schwächere Kiemenentwicklung von der Beschreibung Grube's[1] ab, indem der unpaarige Fühler etwa über die 15, die inneren paarigen Fühler etwa über die 10 bis 11 ersten Segmente hinwegreichen, und die im Maximum erreichte Zahl der Kiemenstrahlen 6 bis 7 beträgt. In einem Falle haben die stärkst entwickelten Kiemen nur 3 bis 4 Radien (Fig. 60) [vielleicht Altersdifferenz?]. Die äusseren paarigen Fühler reichen über die 2 bis 3 vordersten Segmente nach hinten hinweg, während die Buccalcirren ungefähr bis zur Mitte des Kopflappens nach vorn reichen.

Die von den Kiemen eingenommene Strecke reicht bei einem vollständigen Tier mit 100 Segmenten vom 6ten bis zum 27ten, bei zwei anderen Tieren vom 5ten resp. 7ten bis zum 24ten oder 25ten Ruder. An den mittleren und hinteren Rudern findet sich wie bei *Eunice rubra* eine stark dreizähnige ventrale Acicula (Fig. 63), an welcher der unterste Zahn am stärksten entwickelt ist. (Über die Form dieser Acicula vergl. auch bei Verrill[2] den Vergleich der dreizähnigen hinteren Aciculae von *Eunice binominata* und *stigmatura* in der Beschreibung der letzteren.) Die in der Gestalt der Fühler wie in der Form der kammförmigen Kiemen und deren Beschränkung auf eine kürzere vordere Körperstrecke der *E. binominata* ziemlich ähnliche *E. articulata* hat an den hinteren Rudern eine am Ende zweizähnige ventrale Acicula. Fig. 60–63 veranschaulichen ein Ruder mit vierfädiger Kieme, eine zusammengesetzte geflügelte Borste, eine dreizähnige ventrale Acicula und eine einfache Haarborste von einem mittleren Ruder.

Fundort:

Nr. 132.	Depth 115 fms.	Nr. 378.	Depth. 69 fms.
	Lat. Sta. Cruz N.		Lat. Barbados N.
	Long. " W.		Long. " W.

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[1] Grube, Annulata Oerstediana. Vidensk. Meddel. Kjöbenhavn, 1856, p. 59. Auch Ehlers, Florida-Anneliden, 1887, p. 85.

[2] Verrill, Trans. Conn. Acad. Sci., 1900, vol. 10, p. 642.

Eunice collini, sp. nov.

Taf. 4, Fig. 66–73.

Diese Art findet sich vor in einem wohl vollständig oder nahezu vollständig erhaltenen Exemplar von 102 Segmenten und einem vorderen Bruchstück von 47 Segmenten. Das vollständige Exemplar hat eine Länge von ca. 5 cm. und ist an der Basis des Kopflappens 0,2 cm. breit. Die Färbung der Tiere ist ein gelbliches Rotbraun mit mässiger Irisation.

Der Kopflappen (Fig. 66) ist an seinem Vorderrande tief, bis zur Mitte 2lappig eingeschnitten, ungefähr 2mal breiter als lang, ebenso lang wie das Buccalsegment und zwischen den Wurzeln der paarigen hinteren Fühler jederseits mit einem grossen dunklen Augenfleck versehen. Die hinteren 5 Fühler des Kopflappens sind wie die Buccalcirren langgegliedert, am deutlichsten die äusseren paarigen Fühler. Diese letzteren sind 5gliedrig, die inneren paarigen Fühler etwa 9-gliedrig. Der unpaare Fühler (wohl nicht ganz vollständig erhalten) reicht bis ans 10te, die inneren paarigen Fühler bis ans 7te Segment, die äusseren paarigen etwa bis zur Mitte des 2ten Segments nach hinten. Die Buccalcirren sind kurz und erreichen eben den Vorderrand des Buccalsegments.

Das Buccalsegment ist 2mal breiter als lang, so lang wie die drei folgenden Segmente zusammen und 5mal länger als sein hinterer cirrentragender Ringel.

Von den Rudersegmenten sind die ersten 4 bis 5 Segmente länger als die folgenden und etwa 7mal breiter als lang, die mittleren Körpersegmente sind etwa 8mal breiter als lang. Der ziemlich kurze Körper verbreitert sich einigermassen schnell bis ungefähr zum 20ten Segment und nimmt dann ganz allmählich gegen das Hinterende zu an Breite wieder ab.

Die Ruder (Fig. 67) sind etwa $\frac{1}{5}$ bis $\frac{1}{6}$ so lang wie der Körper breit ist; von ihren Anhängen sind die Dorsalcirren undeutlich gegliedert und an den ersten 4 oder 5 Rudern viel länger als das Ruder und mindestens zweimal länger als der Bauchcirrus, an den mittleren Rudern ungefähr so lang wie der Bauchcirrus. Der Bauchcirrus ist an den ersten 4 Rudern etwa fast cylindrisch gestaltet und viel länger als das Ruder, nimmt nach hinten zu ziemlich schnell an Länge ab und ist am Mittelkörper ungefähr so lang wie das Ruder, indem er aus angeschwollener Basis ziemlich plötzlich in einen verschmälerten, cylindrischen kurzen Endteil übergeht. Ruderlippen sind so gut wie nicht vorhanden, allenfalls liesse sich von einer ganz kurzen hinteren Ruderlippe reden (?)

Die Kiemen (Fig. 67) zeichnen sich durch ihre Kürze und ihre Einfädigkeit aus (ganz vereinzelt kommen 2 Fäden an einer Kieme vor) und beginnen vorne mit dem 12ten oder 13ten Ruder und hören mit dem 75ten Ruder etwa hinten auf, wobei noch vereinzelte Kiemenfädchen weiter nach hinten vorkommen können. Die Kiemen sind bei stärkster Entwicklung kaum so lang wie der Dorsalcirrus und werden nach hinten zu noch kürzer. Die Borsten sind an den mittleren Segmenten zu oberst (Fig. 70) einfache, lange haarförmige im Endteil mässig gebogene Borsten mit schmalem gestricheltem oder sehr fein gesägtem Saum; ausserdem kommen am Ende grade abgeschnittene Kamm- oder Meisselborsten und zu unterst zusammengesetzte Borsten vor mit schräg-abgestumpft geflügeltem stark zwei-zähnigem Endglied (Fig. 68). An den vordersten Rudern sind die zusammengesetzten Borsten zarter als an den mittleren und hinteren Rudern und im Gegensatz zu den letzteren (so wenigstens am 1sten und am 2ten Ruder) mit einem Endglied versehen (Fig. 69), von dessen zwei Zähnen der untere länger und schlanker und unter viel spitzerem Winkel gegen den Endzahn geneigt ist. An den mittleren Rudern finden sich 2 bis 3 dorsale dunkelbraune, stumpf nadelförmige Aciculæ und eine schwächere ventrale, schwach gebogene, am Ende 2zähnige und hier abgerundet geflügelte Acicula (Fig. 71) von dunkelbrauner Färbung.

Die Kieferbewaffnung stellt sich folgendermassen dar: Der Unterkiefer (Fig. 73) hat eine kurze Symphyse, die vermutlich abgenutzten Schneiden bilden einen sehr flachen stumpfen Winkel miteinander und tragen in der Mitte des gewellten Randes eine gerundete Einbuchtung; bei besserer Erhaltung der Schneiden sind diese 4zähnig und laufen an ihren Aussenecken in einen abgerundet-zugespitzten Zahn aus. Neben der Symphyse steht jederseits ein etwas nach vorn und einwärts gerichteter, mehr oder minder deutlicher dunkler Strich. Die Oberkiefer sind folgendermassen (Fig. 72) beschaffen.

i. Zange. Mässig gebogen.
ii. Links 7–8 ; rechts 6.
iii. Links 7 ;
iv. Links 4 ; rechts 7.
v. Links 1 ; rechts 1. Unregelmässig viereckig.
vi. Schlank, eiförmig-dreieckig.

Die Gesammtform der Oberkiefer ergiebt sich aus der Figur.

An einem der Exemplare fanden sich Teile einer Röhre, welche von gelblich papierartiger Beschaffenheit und derjenigen der *Eunice floridana* ähnlich waren, mit nur spärlichen anhaftenden Fremdkörpern.

Eine mit *Eunice collini* durch die geringe Entwicklung ihrer Kiemen, die dort zuweilen ganz fehlen sollen, übereinstimmende Form ist die *Eunice cariboa* Grube[1] von St. Croix, welche sich aber durch viel kürzere ungegliederte Fühler andererseits von *E. collini* unterscheidet.

Fundort:

Nr. 154.	Depth 298 fms. Lat. Martinique N. Long. “ W.	Nr. 288.	Depth 399 fms. Lat. Barbados N. Long. “ W.

Eunice spec.

Offenbar verschiedene, wegen Fehlens des Vorderendes oder sonstiger zu schlechter Erhaltung nicht weiter zu beschreibende Formen fanden sich noch von:

Nr. 204.	Depth 476 fms. Lat. Martinique N. Long. “ W.	Nr. 286.	Depth 7–45 fms. Lat. Barbados N. Long. “ W.
Nr. 278.	Depth 69 fms. Lat. Barbados N. Long. “ W.	Nr. 247.	Depth 170 fms. Lat. Grenada N. Long. “ W.
Nr. 134.	Depth 248 fms. Lat. Sta. Cruz N. Long. “ “ W.		

Das Fragment von Nr. 134 steckte in einer dünnhäutigen, biegsamen, an einem irgendwie ins Meerwasser geratenen Zweige befestigten Röhre, welche vollständig sammt dem Zweige umwachsen war von einem Korallenpolypen, anscheinend derselben Form, welche sich mit Vorliebe auf den starren Röhren der *Eunice tibiana* Pourtalès ansiedelt.

Hyalinoecia tubicola O. Fr. Müller.

Onuphis gracilis Ehlers, Florida-Anneliden, 1887, p. 78.

Hyalinoecia artifex Verrill, Proc. U. S. Nat. Mus., 1880, vol. 3, p. 357

Hyalinoecia platybranchis Grube, Annelidenausbeute von Gazelle. Monatsb. k. Akad. Wiss., Berlin, 1877, p. 527.

Diese Art ist in zahlreichen Exemplaren von meist ansehnlicher Grösse vertreten nebst ihren Röhren und von einer Reihe von Fundplätzen z. T. aus beträchtlicher Tiefe. Der grösste Teil der Tiere, welche mir vor-lagen, war von Verrill[1] als zu der von ihm neu aufgestellten *Hyalinoecia artifex* gehörend bezeichnet worden. Nach meiner Auffassung liegt nun kein genügender Grund vor, um die amerikanische *Hyalinoecia artifex* von der europäischen *H. tubicola* als Art abzusondern, man mag sie höchstens als amerikanische Rasse der europäischen Form auffassen. Die Unterschiede der amerikanischen Hyalinoecia von der europäischen Art zeigen sich in der beträchtlicheren Grösse der ersteren, besonders im Vergleiche mit den Mittelmeertieren der Art und in dem etwas variableren Auftreten der vorderen Kiemengrenze. Während bei europäischen Exemplaren von Hyalinoecia die erste Kieme am 22ten, 23ten, 24ten, 25ten, auch 26ten Ruder auftritt, kommt bei den amerikanischen Tieren die erste Kieme am 22ten, 26ten, 29ten, 30ten, oder 31ten Ruder, bei einem jüngeren Exemplar erst am 32ten Ruder vor. Die amerikanischen Exemplare scheinen augenlos zu sein, wenigstens konnte ich an einer Reihe von Exemplaren keine Augen erkennen; doch kommen solche bei der als jugendliches Stadium von Hyalinoecia anzusehenden *Onuphis gracilis* Ehlers vor.

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[1] Grube, Annulata Oerstediana. Vidensk. Meddel. Kjöbenhavn, 1856, p. 57.

Ein paar kleine Exemplare der Hyalinoecia, welche nach der Beschreibung von Ehlers als *Onuphis gracilis* anzusprechen waren, fanden sich in ihren Röhren vor, hatten aber eine so schlecht erhaltene Körperbeschaffenheit grade in der Gegend, wo das Auftreten von Kiemen hätte erwartet werden können, dass es unmöglich war, das Vorhandensein von Kiemen festzustellen. Auch für den Fall, dass noch keine Kiemen entwickelt waren bei diesen *Onuphis gracilis*, sind diese bei der sonstigen Übereinstimmung mit Hyalinoecia wohl nur als eine jugendliche Form der letzteren anzusehen. *Hyalinoecia platybranchis* Grube ist nach der Grube'schen Beschreibung, welche sehr wohl auf *Hyalinoecia tubicola* Anwendung finden kann, mit der letzteren identisch.

Fundort:

Nr. 325.	Depth 647 fms.	Lat. 33° 35′ 20″ N.	Long. 76° W.
Nr. 197.	Depth 1224 fms.	Lat. Martinique N.	Long. " W.
Nr. 309.	Depth 304 fms.	Lat. 40° 11′ 40″ N.	Long. 68° 22′ W.
Nr. 173.	Depth 734 fms.	Lat. Guadeloupe N.	Long. " W.
Nr. 4.	Depth 766 fms.	Lat. 20° 11′ N.	Long. 73° 33′ W.
Nr. 332.	Depth 263 fms.	Lat. 35° 45′ 30″ N.	Long. 74° 48′ W.

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[1] Verrill, Proc. U. S. Nat. Mus., vol. 3, 1880, p. 357.

Nr. 327. Depth 178 fms.
Lat. 34° 00′ 30″ N.
Long. 76° 10′ 30″ W.

Nr. 268. Depth 955 fms.
Lat. Grenada N.
Long. " W.

Nr. 121. Depth 2393 fms.
Lat. Sta. Cruz N.
Long. " W.

Nr. 228. Depth 785 fms.
Lat. St. Vincent N.
Long. " W.

Nr. 117. Depth 874 fms.
Lat. Porto Rico N.
Long. " W.

Nr. 331. Depth 898 fms.
Lat. 35° 44′ 40″ N.
Long. 74° 40′ 20″ W.

Nr. 257. Depth 553 fms.
Lat. Grenada N.
Long. " W.

Nr. 163. Depth 769 fms.
Lat. Guadeloupe N.
Long. " W.

Nr. 230. Depth 464 fms.
Lat. St. Vincent N.
Long. " W.

Nr. 334. Depth 197 fms.
Lat. 38° 21′ 50″ N.
Long. 73° 32′ W.

Nr. 196. Depth 1030 fms.
Lat. Martinique N.
Long. " W.

Nr. 245. Depth 1058 fms.

Nr. 165. Depth 277 fms.
Lat. Guadeloupe N.
Long. " W.

Nr. 336. Jahr 1880.

Nr. 162. Depth 734 fms.
Lat. Guadeloupe N.
Long. " W.

Nr. 227. Depth 573 fms.
Lat. St. Vincent N.
Long. " W.

Nr. —. Depth 87 fms.
Lat. 11° 5′ N.
Long. 61° 17′ W.

Nr. 265. Depth 576 fms.
Lat. Grenada N.
Long. " W.

Onuphis opalina Verrill.

Taf. 4, Figs. 74, 75.

Northia opalina Verrill, Trans. Conn. Acad., 1874, vol. 3, p. 41, Plate 7, Fig. 4.

Eine kleinere Zahl von hinten verstümmelten Exemplaren einer Eunicee glaube ich nach der Beschreibung Verrill's zu *Onuphis opalina* rechnen zu müssen; die vorliegenden Tiere lassen sich mit der Beschreibung von Verrill sehr wohl in Einklang bringen und zeigen mit Ausnahme der vordersten gewölbten Körperpartie eine dorsoventrale Abplattung, welche dem schlanken Körper ein fast bandartig plattes Aussehen verleiht. Zu der Färbung der Tiere ist noch zu bemerken, dass an dem weisslichen Körper eine längslaufende, dorsale, mediane, rotbraune Doppellinie vorkommen kann.

Die Fühler erreichen eine beträchtliche Länge und haben lange geringelte Basalglieder. Bei dem grössten Exemplar, das bei einer Länge von 4,5 cm. noch 129 erhaltene Segmente hat, reicht der unpaare Fühler etwa bis ans 15te, die inneren paarigen bis ans 18te, die äusseren paarigen Fühler bis zum 3ten Segment nach hinten. Das Basalglied der Fühler ist bei dem unpaaren Fühler etwa 7ringelig, bei den äusseren paarigen Fühlern etwa 10ringelig, bei den inneren paarigen etwa 15ringelig, und ist bei dem unpaaren Fühler kürzer, bei den inneren paarigen Fühlern länger als, und bei den äussern paarigen etwa ebenso lang wie die Buccalcirren und hier etwa halb so lang wie die Totallänge der äusseren paarigen Fühler.

Die Segmente des Mittelkörpers sind ungefähr 5- bis 6mal breiter als lang. Die Kiemen beginnen gewöhnlich schon am 1ten, seltener am 2ten Ruder und sind, wie überall, als einfädige Bildung noch am 129ten Segment vorhanden, reichen danach wahrscheinlich bis nahe an das Hinterende des Körpers heran. Über die Borsten ist noch zu bemerken, dass in den vordersten Rudern sich neben capillaren, scharf zugespitzten Borsten zusammengesetzte Borsten finden, welche ein schmales, am Ende mit 3 Zähnen versehenes und zugespitzt geflügeltes Endglied haben (Fig. 74). An den mittleren Segmenten kommen neben am Ende schräg abgeschnittenen Meisselborsten capillare, schwach gebogene, am convexen Rande sehr fein gesägte oder nur gestrichelte Borsten vor. Die beiden ventralen Aciculae der mittleren Ruder haben eine zweizähnige mit abgerundeten Flügeln versehene Spitze (Fig. 75).

Der Kieferapparat dieser Art ist folgendermassen beschaffen:

Die Unterkiefer haben eine kurze Symphyse mit schräger dreizähniger Schneide (wohl abgenutzt), neben der Symphyse steht jederseits ein stumpfwinklig gebrochener, dunkler Winkelstrich.

Oberkiefer:

i. Zange schlank, ziemlich stark gebogen.
ii. Links 6–8; rechts 6–9.
iii. Links 6–9;
iv. Links 6; rechts 8–10.
v. Unregelmässig viereckig.
vi. Dreieckig.

Einige Tiere steckten in zarten, dünnen, häutigen, leicht zerreissbaren Röhren, an denen kleine Fremdkörper in geringer Menge anhafteten.

Onuphis opalina ist offenbar den Arten *Northia elegans* und *N. iridescens* H. P. Johnson[1] von der pacifischen Küste Nordamerika's nahe verwandt und vielleicht nur, wenn nicht mit denselben zusammenfallend, eine Varietät derselben; die Ähnlichkeit zeigt sich auch in der Gestalt des Kieferapparates.

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[1] H. P. Johnson, Proc. Bost. Soc. Nat. Hist., 1901, vol. 29, p. 406–408.

Fundort:

Nr. 228. Depth 785 fms.
Lat. St. Vincent N.
Long. " W.

Nr. 136. Depth 197 fms.
Lat. 38° 21′ 50″ N.
Long. 73° 32′ W.

Nr. 334. Depth 395 fms.
Lat. 41° 29′ 45″ N.
Long. 65° 47′ 10″ W.

Nr. 326. Depth 464 fms.
Lat. 33° 42′ 15″ N.
Long. 76° 00′ 50″ W.

Nr. 307. Depth 980 fms.
Lat. 41° 29′ 45″ N.
Long. 65° 47′ 10″ W.

Onuphis rubrescens, sp. nov.

Taf. 4, Fig. 76–83.

Diese Art, von kräftigerem Bau als die vorhergehende und wie diese mit einfädigen Kiemen ausgestattet, wird durch wenige Exemplare, welche alle hinten verstümmelt sind, vertreten. Die Färbung der Tiere ist ein mehr oder minder lebhaftes, glänzendes Rotbraun, welches irisiert und am Hinterkörper mehr in's Gelbliche zieht. Ein Exemplar mit 100 erhaltenen Segmenten hatte eine Länge von 4,1 cm., ein noch längeres aus zwei Bruchstücken bestehendes Exemplar enthielt 125 Segmente. Die Körperform der Tiere ist im Allgemeinen eine dorsoventral abgeplattete und von ziemlich gleichmässiger Breite am Mittelkörper; am Vorderende ist der Körper etwa bis zum 6ten Segment dorsal gewölbt, erreicht seine grösste Breite in der vordern Körperhälfte und nimmt dann sehr allmählich nach hinten zu an Breite ab.

Der Kopflappen (Fig. 76) ist 2mal breiter als lang und trägt zwischen den Wurzeln der paarigen Fühler hinten jederseits einen kleinen dunklen Augenfleck; er ist etwas länger als das Buccalsegment und ebenso lang wie das 2te Segment. Von den hinteren 5 Fühlern des Kopflappens sind die 3 mittleren beträchtlich lang, die 2 äusseren bedeutend kürzer und alle mit kurzen geringelten Basalgliedern versehen, welche kürzer als die Buccalcirren sind. Die 5 hinteren Fühler können je nach ihrem Erhaltungszustande in ihrer Länge sich ziemlich verschieden verhalten und, obgleich ungegliedert, durch Querrunzelung eine Gliederung vortäuschen. In einem Falle (bei starker Ausdehnung, sonst sind sie kürzer) reichen die inneren Antennen etwa bis zum 25ten, der unpaare Tentakel bis ans 27te und die äusseren Antennen bis ans 2te bis 3te Segment nach hinten. Die Basalglieder der Fühler sind beim Tentakel und den äusseren Antennen etwa 7ringelig, bei den innern Antennen etwa 9ringelig. Die Stirnfühler sind kegelförmig, dorsoventral ein wenig abgeplattet, etwa halb so lang wie der Kopflappen und an ihrer Basis deutlich getrennt. Die beiden Buccalcirren sind ebenso lang oder etwas länger als der Kopflappen und entspringen dem Seitenrande des Buccalsegments näher als dessen Mitte, sie sind wie die Dorsalcirren ungegliedert. Die Palpen oder Praeoralwülste, median durch eine tiefe Furche getrennt, reichen seitlich bis an die Wurzel der äusseren Antennen.

Das Buccalsegment ist etwa 3mal breiter als lang, etwas kürzer als das 2te und 3te, etwa 2mal länger als die mittleren Segmente. Die ersten 5 Segmente etwa sind länger als die mittleren Segmente und das 2te, das längste derselben, etwa 3mal so lang wie die mittleren Segmente. Die mittleren und hinteren Segmente sind ungefähr 7- bis 8mal breiter als lang.

Von den Rudern erreichen die mittleren (Fig. 77) mit den Borsten nicht die halbe Körperbreite, die vordersten sind stärker entwickelt als die hinteren, namentlich die 2 ersten, welche schräg nach vorn gerichtet sind; das 1te Ruder reicht mit seinem Dorsalcirrus soweit wie das Buccalsegment nach vorn.

Von den Anhängen der Ruder ist der Dorsalcirrus an den vorderen 12 bis 15 Rudern am stärksten und längsten, 2- bis 3mal länger als das Ruder, ist aber am 1ten kiementragenden Ruder schon kürzer als die Kieme. Der Ventralcirrus ist bis zum 5ten Ruder etwa stärker als hinten entwickelt, kegelförmig und etwa so lang wie das Ruder und ist von da ab zu einem länglichen Polster reduziert. Die Kiemen sind einfädig, beginnen bei 4 verschiedenen Tieren am 14ten, 17ten, 17ten, 18ten Ruder und sind bei einem Exemplar am 125ten erhaltenen Segment noch vorhanden, erstrecken sich demnach weit am Körper nach hinten. Die Kiemen sind bei stärkster Entwicklung 3mal länger als der Rückencirrus und länger als die halbe Körperbreite. Am Ende des Ruders findet sich an den vorderen Rudern eine hintere kegelförmige Lippe, die, anfangs von Ruderlänge, mit dem 12ten Ruder etwa verschwindet.

Die Borsten treten an den mittleren Segmenten in 3 Formen, an den allervordersten in 2 Formen auf. An den vordersten Rudern finden sich neben haarförmigen, im Endteil etwas gebogenen und schmal gesäumten Borsten zusammengesetzte Borsten, deren Endglied spitz geflügelt (Fig. 81) ist und am Ende drei etwas hakige Zähne trägt. Die mittleren Ruder tragen 1) lange kaum gebogene haarförmige Borsten (Fig. 78), welche etwas schmäler gesäumt sind als die Haarborsten der vordersten Ruder, 2) Meisselborsten (Fig. 79) mit am Ende schräg begrenzter Endfläche. Daneben finden sich ventral zwei starke gelbe, abgestutzt geflügelte acicula-artige Haken (Fig. 80) mit stark zweizähniger Spitze; dorsal liegen 2 feinere Aciculae im Ruder und endigen in eine sehr feine, im stumpfen Winkel über die Haut hervorragende Spitze.

Für die Kiefer, deren Gesammtbild aus den Fig. 82 und 83 ersichtlich ist, ergiebt sich folgendes:

Oberkiefer.

i. Zange mässig gebogen.
ii. Links 8–9; rechts 8–9.
iii. Links 7–8.
iv. Links 6–10; rechts 6.
v. Je ein accessorisches, unregelmässig viereckiges Stück.

Der Unterkiefer hat eine kurze Symphyse und bei guter Erhaltung wohl dreizähnige Schneiden, jederseits neben der Symphyse ist ein dunkler etwas gebrochener Strich angedeutet.

Es fanden sich an den Tieren Stücke von einer Röhre, von zarter dünnhäutiger Beschaffenheit, an denen an der Aussenfläche sich ein Belag von Fremdkörpern wie Sand u. s. w. befand, der wohl zum Teil verloren gegangen sein mochte durch Abreibung.

Fundort:

Nr. 241.	Depth 163 fms. Lat. Cariacou N. Long. " W.	Nr. 218.	Depth 164 fms. Lat. St. Lucia N. Long. " W.

Onuphis eschrichti Örsted.

Fundort:

Nr. 303.	Depth 306 fms. Lat. 41° 34′ 30″ N. Long. 65° 34′ 30″ W.	Nr. 230.	Depth 464 fms. Lat. St. Vincent N. Long. " W.

Diopatra glutinatrix Ehlers.

Taf. 4, Fig. 84, und Taf. 5, Fig. 85, 86.

Über diese Art, welche von einer Reihe von Fundplätzen vorliegt, sind einige Bemerkungen zu machen auf Grund der Vergleichung des in der Göttinger Sammlung aufbewahrten Originalexemplars mit den vorliegenden Tieren.

Diopatra glutinatrix[1] wird als eine kiemenlose Form beschrieben nach einem jüngeren Exemplar, welches der Beschreibung von Ehlers zu Grunde lag und als Kiemenrudimente gedeutete Höcker an den Rudern besass (*loc. cit.*, p. 77). Das hinten verstümmelte Exemplar der Göttinger Sammlung trägt nun aber Kiemen und stimmt darin mit den mir vorliegenden Tieren überein. Die Kiemen beginnen bald hinter dem Vorderende der Tiere und nehmen wahrscheinlich die vordere Körper hälfte oder $\frac{2}{3}$ der Körperlänge etwa ein. Die Kiemen beginnen als ein kurzer Faden, welcher kürzer als der Dorsalcirrus ist, und erreichen ihre höchste Entwicklung in der vorderen Körperhälfte mit 3 Kiemenfäden (Fig. 85). Die Länge der Kiemen ist ziemlich verschieden bei den verschiedenen Tieren (verschiedene Contraction) und kann kaum so lang, aber auch doppelt so lang wie der Dorsalcirrus sein. Bei starker Streckung reichen die höchstentwickelten Kiemen gut über die halbe Rückenbreite hinweg, sind jedoch häufig kürzer. Die erste Kieme steht bei 7 verschiedenen Exemplaren am 9ten, 10ten, 11ten, oder 12ten, 3mal am 14ten und am 13ten Ruder (Originalexemplar). Die letzte Kieme steht beim Originalexemplar am 59 Ruder etwa, bei andern Exemplaren noch am 70 (letztes erhaltenes Rudersegment), am 57ten resp. am 67 Ruder bei zwei andern Tieren. Bei einem Exemplar mit 56 erhaltenen Segmenten beginnen die Kiemen am 14ten Ruder 2fädig, erreichen ihre Hauptentwicklung vom 19ten bis 42ten Ruder, wo sie 3- selten 4fädig sind und die doppelte Länge des Dorsalcirrus erreichen, und werden bis zum 55ten Ruder, welches noch Kiemen trägt, wieder einfädig.

Nach dem Gesagten ist daher anzunehmen, dass *D. glutinatrix* in jungem Zustande noch keine Kiemen trägt, sie aber später in der Regel besitzt. Dass auch bei grossen Exemplaren zuweilen die Kiemen fehlen können, zeigte sich darin, dass bei einem Exemplar von ca. 5,8 cm. Länge und mit 59 Segmenten keine Kiemen zu erkennen waren, die Röhre dieses Tieres war so beschaffen, wie sie in der Originalbeschreibung beschrieben wird. Über die Röhre dieser Art ist noch anzufügen, dass das Material, welches dieselbe an der Aussenfläche bedeckt, je nach dem Wohnort des Tieres verschieden gewählt zu werden scheint, und daher Tiere auf schlammigen Sandgrunde zum Überzuge ihrer Röhre auch schlammigen Sand wählen (Fig. 84), welcher der Röhre eine etwas lederartige Konsistenz verleiht. Manche der aus ihren Röhren entnommenen Tiere zeigen eine gelblich fleischfarbene Färbung mit mehr oder minder lebhaftem rötlich-violettem Glanze.

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[1] Ehlers, Florida-Anneliden, 1887, p. 76, Taf. 18, 19.

Es mögen an dieser Stelle noch einige Bemerkungen über *Diopatra pourtalési* Ehlers platzfinden, welche in ihrem Habitus der *D. glutinatrix* ziemlich ähnlich ist. Bezüglich des Auftretens der Kiemen scheint *D. pourtalési* sich bisweilen analog wie *D. glutinatrix* zu verhalten, indem die Mehrzahl der Exemplare Kiemen aufweist, jedoch gleich grosse Tiere mitunter keine Kiemen besitzen. Bei einem Tier mit 32 erhaltenen Rudersegmenten von ca. 2,8 cm. Länge und 0,15 cm. Breite am 1ten Rudersegment waren keine Kiemen zu entdecken, ebensowenig bei einem Exemplar mit 50 erhaltenen Rudersegmenten und etwa gleicher Stärke; beide Tiere waren der für die Art characteristischen Röhre entnommen.

Über die Röhre der *D. pourtalési* lässt sich noch bemerken, dass dieselbe wie bei *D. glutinatrix* ein verschiedenes Aussehen zeigen kann. Im allgemeinen hat sie eine stark dorsoventral abgeplattete Form und ist gleichsam wie zwischen zwei Leiterbäumen, zwischen starren langen Fremdkörpern, als Spongiennadeln, Echinidenstacheln u. s. w. ausgespannt; mitunter ist der abgeplattete Character der Röhre verwischt und sie erscheint im Querschnitt mehr rundlich, vielleicht im Zusammenhang mit einer allseitigeren Bedeckung von kleineren Fremdkörpern, z. B. kurzen Spongiennadeln. Abgesehen von der Röhre bieten die zusammengesetzten Borsten der vordersten Ruder, wenn sie gut erhalten sind, noch ein gutes Merkmal zur Unterscheidung von *D. glutinatrix* und *D. pourtalési*. Bei *D. glutinatrix* (Fig. 86) ist das Endglied dieser Borsten schmal, trägt am Ende zwei kleinere Zähne und wird von zwei Flügeln umscheidet, welche in eine ziemlich lange haarfeine Spitze auslaufen. Bei *D. pourtalési* jedoch (Fig. 87) trägt das breite Endglied einen sehr starken Endzahn und einen kleineren Nebenzahn, welche durch einen weiteren bogigen Zwischenraum getrennt sind als bei *D. glutinatrix*; die Flügel der Borsten der *D. pourtalési* sind breiter als bei *D. glutinatrix*, sanft gebogen und endigen stumpf zugespitzt.

Fundort:

Nr. 135. Depth 450 fms.
Lat. St. Cruz N.
Long. " W.

Nr. 200. Depth 472 fms.
Lat. Martinique N.
Long. " W.

Nr. 176. Depth 391 fms.
Lat. Dominique N.
Long. " W.

Nr. 185. Depth 333 fms.
Lat. Dominique N.
Long. " W.

Nr. 136. Depth 508 fms.
Lat. Frederickstaed N.
Long. " W.

Nr. 195. Depth 501 fms.
Lat. Martinique N.
Long. " W.

Nr. 18. Depth 600 fms.
Lat. 18° 20′ 30″ N.
Long. 87° 16′ 40″ W.

Nr. 227. Depth 573 fms.
Lat. St. Vincent N.
Long. " W.

Nr. 101. Depth $\frac{175}{250}$ fms.
Lat. Off Morro Light N.
Long. " W.

Nr. 111. Depth 1200 fms.
Lat. 14° 7′ N.
Long. 74° 52′ W.

Nr. 264. Depth 416 fms.
Lat. Grenada N.
Long. " W.

Nr. 214. Depth 476 fms.
Lat. Martinique N.
Long. " W.

Nr. 240. Depth 164 fms.
Lat. Grenadines N.
Long. " W.

Nr. 211. Depth 357 fms.
Lat. Martinique N.
Long. " W.

Nr. 173. Depth 734 fms.
Lat. Guadeloupe N.
Long. " W.

Nr. —. Depth 555 fms.
Lat. 17° 30′ N.
Long. 79° 14′ W.

Nr. 201. Depth 565 fms.
Lat. Martinique N.
Long. " W.

Nr. 210. Depth 191 fms.
Lat. Martinique N.
Long. " W.

Nr. 288. Depth 399 fms.
Lat. Barbados N.
Long. " W.

Diopatra pourtalési Ehlers.

Taf. 5, Fig. 87.

Ehlers, Florida-Anneliden, 1887, p. 74, Taf. **19**, **20**.

Über diese Art vergleiche unter *Diopatra glutinatrix*.

Fundort:

Nr. 220. Depth 116 fms.
Lat. Sta. Lucia N.
Long. " W.

Nr. 291. Depth 200 fms.
Lat. Barbados N.
Long. " W.

Nr. 224. Depth 144 fms.
Lat. St. Vincent N.
Long. " W.

Nr. 154. Depth 298 fms.
Lat. Montserrat N.
Long. " W.

Nr. 124. Depth 114 fms.
Lat. St. Vincent N.
Long. " W.

Nr. 330. Depth 464 fms.
Lat. St. Vincent N.
Long. " W.

Nr. 299. Depth 140 fms.
Lat. Barbados N.
Long. " W.

Nr. 221. Depth 423 fms.
Lat. Sta. Lucia N.
Long. " W.

Nr. 288. Depth 399 fms.
Lat. Barbados N.
Long. " W.

Nr. 222. Depth 422 fms.
Lat. Sta. Lucia N.
Long. " W.

Nr. 210. Depth 191 fms.
Lat. Martinique N.
Long. " W.

Nr. 231. Depth 95 fms.
Lat. St. Vincent N.
Long. " W.

Nr. 130. Depth 451 fms.
Lat. Frederickstaed N.
Long. " W.

Nr. 259. Depth 124 fms.
Lat. Milligan N.
Long. " W.

Nr. 211. Depth 357 fms.

Nr. 195. Depth 502½ fms.
Lat. Martinique N.
Long. " W.

Nr. 208. Depth 213 fms.
Lat. Martinique N.
Long. " W.

Nr. 273. Depth 103 fms.
Lat. Barbados N.
Long. " W.

Diopatra spiribranchis, sp. nov.

Taf. 5, Fig. 88–96.

Es fanden sich von einem Fundort eine Anzahl von Röhren vor, welche grosse Ähnlichkeit mit den Röhren von Maldaniden hatten und eine Diopatra enthielten. Die Würmer erwiesen sich mit Ausnahme weniger noch einigermassen erhaltener als für eine Beschreibung unbrauchbar infolge von Maceration. Von den wenigen noch brauchbaren Tieren ist eines allerdings mit regeneriertem Vorderende, hinten wohl vollständig erhalten und hat einige 80 Segmente; ein anderes hinten verstümmeltes Exemplar von etwa 2,6 cm. Länge enthält 52 Segmente und ist an der Basis des Kopflappens 0,15 cm. breit.

Die Färbung der Tiere ist gelblich, etwas irisierend und dorsal auf jedem Segment mit einer mittleren braunroten, vor den Kiemen und median verbreiterten Querbinde und einer vorderen kürzeren Querbinde, welche die Seitenteile der Segmente freilässt, gekennzeichnet. Die Fühler sind mit drei oder vier braunen Querbinden versehen. Die Körperform dieser Art (Fig. 89) ist in der vorderen Hälfte im Querschnitt ziemlich drehrund und gleichmässig breit, nur ganz vorn gegen das Vorderende ein wenig verschmälert, in der hinteren Körperhälfte mehr abgeplattet. Der Kopflappen ist etwa 1½mal breiter als lang und etwa 2mal länger als das Buccalsegment; das letztere ist etwa so lang wie das 6te Segment, etwas kürzer als die diesem vorhergehenden Segmente und selbst fast 3mal breiter als lang. Der Kopflappen trägt jederseits zwischen und etwas hinter den Wurzeln der paarigen Antennen einen kleinen, nicht sehr deutlichen Augenfleck. Die Fühler sind ungegliedert und haben (die 5 hinteren) ziemlich lange braun geringelte Basalglieder (Fig. 89) welche länger als die Buccalcirren und mindestens so lang wie der Kopflappen, an den inneren Antennen entschieden länger als der Kopflappen sind. Der unpaare Fühler mit etwa 10ringeligem Basalgliede reicht bis an das 15te, die inneren paarigen Fühler mit 13-ringeligem Basalglied reichen bis ans 17te, die äusseren paarigen mit 10- oder 11ringeligem Basalgliede bis reichlich ans 7te Segment nach hinten. Das Grundglied der längsten Fühler, der inneren Antennen, beträgt etwa $\frac{1}{7}$ der Gesammtlänge dieser Fühler. Die kurzen kegelförmigen Stirnfühler sind an ihrer Basis etwas getrennt und etwa $\frac{3}{4}$ so lang wie der Kopflappen; die Praeoralwülste oder Palpen sind quereiförmig und seitlich in eine kegelförmige Ecke ausgezogen. Die Buccalcirren sind fadenförmig, kurz, dem Seitenrande des Buccalsegments mehr genähert als dessen Mitte, kürzer als der Kopflappen.

Von den Körpersegmenten sind das 2te bis 5te etwa gleichlang und 3mal breiter als lang, länger als die mittleren Segmente, welche ungefähr 5mal breiter als lang sind.

Die Ruder ragen nur wenig hervor, die vordersten sind länger als die mittleren und nach vorn gerichtet, das 1ste Ruder reicht etwa bis an die Wurzel der Buccalcirren. Die mittleren Ruder (Fig. 90) sind etwa $\frac{1}{5}$ oder $\frac{1}{6}$ so lang wie der Körper breit ist. Der Ventralcirrus ist im Allgemeinen zu einem Polster reduziert, nur an den 5 vordersten Rudern etwa kegelförmig gestaltet und mindestens von Ruderlänge.

Der Rückencirrus von Fadenform, enthält eine feine in seine Basis eingebettete Acicula, ist an den ersten 3 Rudern etwa $1\frac{1}{2}$mal länger als das Ruder und an den mittleren Rudern gut so lang wie das Ruder mit Borsten. An der Spitze der seitlich compressen Ruder steht eine hintere kegelförmige Lippe von Ruderlänge an den vordersten Segmenten, dieselbe verstreicht nach hinten zu allmählich und ist am Mittelkörper kaum noch erkennbar.

Die Kiemen (Fig. 90) beginnen am 5ten oder 6ten Segment sofort als ein starker dicker Stamm mit spiralig gestellten kurzen Fäden, welche kaum so lang sind wie der Kiemenstamm an der Basis breit ist und gegen seine Spitze zu an Länge abnehmen. Die 1ste Kieme ist mindestens so lang wie der Körper breit ist, die Kiemen nehmen schnell an Länge zu und erreichen bis zum 12ten Segment etwa ihre stärkste Entwicklung bei $1\frac{1}{2}$facher Länge der Körperbreite und mit etwa 8 Spiralwindungen von Kiemenfädchen. Vom 12ten Segment ab nehmen die Kiemen an Länge und Stärke allmählich ab. Nachdem die Kiemen den Höhepunkt ihrer Entwicklung überschritten haben, wird der Kiemenstamm mit abnehmender Länge dünner und zarter und erscheint allmählich bedeutend dünner als die Kiemenradien lang sind; die Kiemen nehmen zugleich mit der Abnahme der Zahl der Spiralwindungen mehr und mehr eine federartig abgeflachte Form an.

Wie weit die Kiemen am Körper nach hinten auftreten, ist nicht sicher zu bestimmen, sie nehmen wahrscheinlich bei vollkommener Erhaltung des Körpers etwa $\frac{3}{4}$ von dessen Länge ein. Bei dem eingangs erwähnten vorderen Bruchstück eines Tieres mit noch 52 Segmenten war die letzte Kieme am letzterhaltenen Segment noch nicht einfädig, resp. trug, obwohl viel kürzer als der Rückencirrus, noch wenige Fädchen. Am Hinterende des Körpers sind wahrscheinlich 2 kürzere und 2 längere Analcirren vorhanden.

Die Borsten sind an den vordersten Rudern, einfache, haarförmige, schwach gebogene, schmal gesäumte Haarborsten und zusammengesetzte (Fig. 91) am Ende spitz geflügelte Borsten, mit an der Spitze kräftig 2zähnigem Endglied; daneben finden sich an den vorderen Rudern eine Anzahl (8--9) fein haarförmig endigender Aciculae (Fig. 92), welche an den mittleren Segmenten zu 4 dorsal auftreten. An den mittleren Rudern kommen neben den einfachen Haarborsten (Fig. 94) am Ende schief abgeschnittene Meisselborsten vor und zwei ventrale braungelbe acicularartige Haken (Fig. 93) mit 2zähniger Spitze und schräg abgestutzter Flügelkappe am Ende.

Die Gestaltung der Kiefer im Allgemeinen ergiebt sich aus Fig. 95, 96.

Der Unterkiefer mit kurzer Symphyse und ausgerandeten, an den äusseren und inneren Ecken spitz vorgezogenen Schneiden trägt jederseits neben der Symphyse einen kurzen dunklen, stumpfwinklig gebrochenen Längsstrich.

Für den Oberkiefer ergeben sich folgende Zahlen:

i. Zange mässig gebogen.
ii. Links 7–9; rechts 9.
iii. Links 7–8.
iv. Links 5–6; rechts 7–11.
v. Links 1; rechts 1.

Die Röhren (Fig. 88), in welchen die Würmer steckten, sind viel länger als ihre Bewohner, haben eine schmutzig braungraue Färbung und haben ziemliche Ähnlichkeit mit den Röhren der *Maldane cucculligera* aus Westindien; die Röhren bestehen aus einer organischen, häutigen aber ziemlich zähen Grundlage, welche an ihrer Aussenfläche in verschiedener Stärke mit einer dicken Schlammschicht überkleidet ist.

Fundort:
Depth 87 fms.
Lat. 11° 5′ N.
Long. 61° 17′ W.

Lumbriconereis robusta Ehlers.

Es liegt von dieser Art eine Anzahl von Tieren vor, welche sämtlich hinten verstümmelt sind. Einige der Tiere erscheinen von schlankerem Habitus als die übrigen, welcher da die Tiere eine geringere Dicke haben, wohl nur auf eine geringere Grösse zurückzuführen ist. Der Unterkiefer hat bei vollkommenem Erhaltungszustande eine etwas andere Form als sie [1] in der Originalbeschreibung abgebildet wird, indem die Schneiden alsdann unter einem spitzeren Winkel gegen einander geneigt sind und unmittelbar neben der Symphyse jederseits einen eiförmig zugespitzten starken Zahn tragen.

Fundort:

Nr. 336. Depth 197 fms.
Lat. 38° 21′ 50″ N.
Long. 78° 32′ W.

Nr. 345. Depth 71 fms.
Lat. 40° 10′ 15″ N.
Long. 71° 4′ 30″ W.

Nr. 248. Depth 161 fms.
Lat. Grenada N.
Long. " W.

Nr. 332. Depth 236 fms.
Lat. 35° 45′ 30″ N.
Long 74° 48′ W.

Nr. 280. Depth 221 fms.
Lat. Barbados N.
Long. " W.

Nr. 274. Depth 209 fms.
Lat. Barbados N.
Long. " W.

Nr. 307. Depth 980 fms.
Lat. 41° 29′ 45″ N.
Long. 65° 47′ 10″ W.

LYCORIDAE.

Nereis versipedata Ehlers.

Florida-Anneliden, 1887, p. 116, Taf. **36**.

Es fanden sich nur wenige Exemplare von dieser Art vor, welche mit der Beschreibung derselben (*loc. cit.*) übereinstimmen. Es lässt sich der Beschreibung noch hinzufügen, dass in der Gruppe III des maxillaren

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[1] Ehlers, Florida-Anneliden, 1887, Taf. **31**, Fig. 3.

Rüsselabschnitts statt zweier in einer Längsreihe stehender Paragnathen nur einer oder auch 3 hintereinander vorkommen können.

Fundort:

Nr. 203. Depth 96 fms.
Lat. Martinique N.
Long. " W.

Nr. 292. Depth 56 fms.
Lat. Barbados N.
Long. " W.

Nr. 132. Depth 115 fms.
Lat. St. Cruz. N.
Long. " W.

Nr. 142. Depth 27 fms.
Lat. Hannegan Pass. N.
Long. " W.

Nereis rigida GRUBE.

Taf. 5, Fig. 97–101.

Annulata Örstediana. Vidensk. Meddel. Kjöbenhavn., 1856–57, 1857, p. 162.

Die Art wird vertreten durch 16 Exemplare einer Nereide, welche ich nach der Beschreibung Grube's nach einem Exemplare von Puntarenas (Costa Rica), als die vorstehende Art identificiert habe. Diese Art, von welcher hier eine etwas ausführlichere Beschreibung mit einigen Figuren gegeben wird, gehört wie die folgende zu den Nereiden mit einfach conischen Paragnathen und gleichartig gebildeten Rudern ohne Flösschenbildung am dorsalen Ruderast. Die Tiere haben eine gelblich fleischfarbene Färbung und irisieren etwas. Eines der grössten vollständig erhaltenen Exemplare hat bei einer Zahl von 96 Segmenten eine Länge von 4,7 cm. und eine grösste Breite von 0,3 cm., mit den Rudern von 0,4 cm. ca.

Der Körper ist im Allgemeinen dorsoventral abgeflacht, ungefähr 1½mal breiter als hoch, im vorderen Viertel, von hinten nach vorn zunehmend, dorsal stärker gewölbt und hinter dem Kopflappen etwa so hoch wie breit.

Der Kopflappen (Fig. 97) ist ungefähr 6eckig begrenzt, hinten so breit wie lang und doppelt so lang wie seine Stirnpartie. Die fadenförmigen wie die Buccalcirren ungegliederten Fühler stossen an der Basis zusammen und sind etwa ⅔ so lang wie der Kopflappen; 2 grosse schwarze Augen, von denen die vorderen grösser als die hinteren sind, nehmen jederseits die hinteren Ecken des Kopflappensechsecks ein. Die Palpen sind abgeflacht cylindrisch-eiförmig, überragen kaum die Fühler und haben ein ganz eingesenktes, dünneres cylindrisches Endglied. Von den Buccalcirren reicht der längste (obere hintere) je nach den Umständen über die 5 bis 6 oder auch 7 bis 8 folgenden Segmente hinweg.

Die untere Begrenzung des Mundes wird bei eingezogenem Rüssel von einem trapezförmigen Mundpolster gebildet von der Länge etwa der 2½ folgenden Segmente. Das Buccalsegment ist 2½ bis 3mal breiter als lang, 1½mal länger als das nächstfolgende Segment; die 5 darauf folgenden Segmente sind etwa 3½mal breiter als lang, die Segmente des Mittelkörpers etwa 4mal breiter als lang.

Die grösste Körperbreite, welche mit dem Buccalsegment beginnt, erhält sich ungefähr bis zum 8- bis 10ten Segment, dann findet eine allmähliche Abnahme der Breite nach hinten zu statt. An der Bauchseite verläuft eine sich nach hinten vertiefende schmale Bauchfurche.

Die Bewaffnung des ausgestülpten Rüssels, welcher etwa so lang ist wie die 6 ersten Segmente, zeigt eine Ausstattung mit conischen Paragnathen, von denen diejenigen des maxillaren Rüsselabschnitts schwächer als die des oralen Abschnitts sind. Die braunen Kiefer sind mässig gebogen und 6- oder 7zähnig. Die Anordnung der Paragnathen (vergl. Fig. 97, 98) ist folgende:

Maxillaria:

i. Kleine 6eckige aufrechte bis kreisförmige Gruppe (7–8 Zähnchen).
ii. Schräger kaum gebogener Streifen.
iii. Quere Binde.
iv. Dreieckiger, schräger, gestreckter Haufen.

Oralia:

v. 1 oder 2 nebeneinander oder 0 (wenn 1, liegt er asymmetrisch) in einer Querreihe.
vi. 4–6 in Form eines stehenden Kreuzes.
vii + viii. Einen queren Gürtel bildend, der oben seitlich unregelmässig einreihig, übrigens unregelmässig 2–3reihig ist und in der hinteren Reihe mehr Zähnchen enthält als in der vorderen.

Von den normalen 2ästigen mittleren Rudern (Fig. 99) weichen die zwei vordersten durch ihre Einästigkeit ab und enthalten nur eine dorsale und ventrale schlank kegelförmige Lingula, welche vom Ventralcirrus nicht, vom Dorsalcirrus weit an Länge übertroffen werden.[1] Die mittleren Ruder sind etwa halb so lang wie der Körper breit ist, tragen dem 1ten und 2ten Ruder entsprechend am dorsalen Ruderast eine obere und untere, am ventralen Ast eine untere schlank kegelförmige Lingula, von denen die des Ventralastes etwas kürzer ist als die des Dorsalastes. Die Lingulae des dorsalen Ruderastes sind an den hinteren Rudern durch Drüseneinlagerung braun gefärbt.

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[1] Unter Lingulae oder Züngelchen sind solche Bildungen verstanden, welche ober- und unterhalb des Borstenbündels entspringen, als Labien oder Lippen solche, die vorn oder hinten seitlich neben dem Borstenbündel stehen.

Der etwas längere dorsale Ruderast ist etwa um die Höhe des ventralen Ruderastes von diesem getrennt. Der Ventralcirrus nimmt von vorn nach hinten an Länge ab und reicht, während er an den vordersten Rudern doch mindestens der unteren Lingula an Länge gleichkommt, an den hinteren Rudern ungefähr halb so weit wie die ventrale Lingula. Der Dorsalcirrus der mittleren Ruder entspringt etwa auf halber Ruderlänge und ist doppelt so lang wie die obere dorsale Lingula.

Die in 2 Formen schon im 1ten und 2ten Ruder auftretenden Borsten sind längere schwächere Dorsalborsten (Fig. 101) mit langem haarförmigem Endglied (ebenfalls im Ventralast der hinteren Ruder), und kürzere, stärkere Ventralborsten (in den hintern Rudern nur zu unterst im Ventralast) mit kurzem Sichelanhang (Fig. 100). Die Grätenborsten haben ein einseitig fein gesägtes Endglied von etwa ⅓ der Gesammtborstenlänge und einen graden im Dorsalast am Ende gleichzinkigen, im Ventralast ungleichzinkigen Schaft. Die Sichelborsten haben einen etwas gebogenen Schaft mit einem kurzen schmalen, in ungleichzinkiger Gabel eingelenkten, ziemlich lang gewingerten Sichelanhang.

Das Hinterende des Körpers trägt 2 fadenförmige Analcirren von der Länge der 14 letzten Segmente etwa.

Fundort:
Nr. 192. Depth 138 fms.
Lat. Dominica N.
Long. " W.

Nereis bicruciata, sp. nov.

Taf. 5, Fig. 102–104; Taf. 6, Fig. 105.

Diese Art ist nur in einem hinten verstümmelten Exemplar mit 36 Segmenten und von 1,7 cm Länge vertreten, welches der vorhergehenden Art ziemlich ähnlich gebaut ist, sich aber durch die Rüsselbewaffnung und die gegliederten (?) Cirren und Fühler unterscheidet. Die Färbung des Tieres ist graugelblich mit schwach irisierendem Glanze.

Der etwas verdrückte Körper dieses Exemplars hat seine grösste Breite in der vorderen Körperhälfte und nimmt dann allmählich an Breite nach hinten ab. Die Segmente in der vorderen Körperhälfte sind etwa 4mal breiter als lang, weiter nach hinten noch schmäler. Der Kopflappen (Fig. 102) ist 6eckig gestaltet, hinten etwa so breit wie lang, wenig länger als das Buccalsegment, sein Stirnteil etwa halb so lang wie der Kopflappen. Zwei Paar schwarzer Augen, von denen die vorderen etwas grösser sind als die hinteren, nehmen die 4 hinteren Ecken des

Kopflappensechsecks ein. Die fadenförmigen Fühler stossen an ihrer Basis zusammen und sind etwa $\frac{2}{3}$ so lang wie der Kopflappen; die cylindrischen Palpen mit ganz kurzem eingesenktem, eiförmigem Endgliede sind kaum so lang wie die Fühler. Von den Buccalcirren reichen die längsten (obere hintere) über die 10 bis 11 ersten Segmente nach hinten. Das Buccalsegment ist etwa 3mal breiter als lang, so lang wie die 2 folgenden zusammen, und ist ventral in ein Mundpolster von der Länge der $2\frac{1}{2}$ nächsten Segmente erweitert.

Bezüglich der Buccalcirren und Fühler ist es bei deren Erhaltungszustande zweifelhaft, ob dieselben wirklich gegliedert sind; nach der Beschaffenheit der etwas verschrumpften Buccalcirren ist eine Gliederung derselben am ehesten als wahrscheinlich zu bezeichnen, weniger deutlich ist die scheinbare oder wirkliche Gliederung der Fühler und am wenigsten deutlich und sicher an den Dorsalcirren der Ruder.

Die Ruder verhalten sich in ihren Componenten wie bei der vorhergehenden Art und sind mit Ausnahme des ersten und 2ten zweiästig. Die mittleren Ruder (Fig. 103) tragen am dorsalen Ruderast 2 dorsale (eine untere und obere) kegelförmige Lingula, und am Ventralast eine untere Lingula, welche kürzer ist als die dorsalen Lingulae; alle 3 Lingulae sind schon an den vorderen Rudern am Ende durch drüsige Einlagerungen braun gefärbt.

Die mittleren Ruder sind kaum halb so lang wie der Körper breit ist und die beiden Ruderäste, von denen der dorsale ein wenig länger als der ventrale ist, liegen dicht aufeinander. Der Dorsalcirrus ist an den vordersten Rudern ungefähr doppelt so lang wie die obere Lingula, an den mittleren Rudern etwa $\frac{1}{3}$ länger als die letztere; der Ventralcirrus, an den vordersten Rudern von der Länge der unteren Lingula, reicht an den mittleren Rudern etwa halb so weit wie die Lingula des Ventralastes. Während die Lingula des ventralen Ruderastes diesem an Länge gleichkommt, überragen die Lingulae des dorsalen Ruderastes diesen beträchtlich.

Die beiden an den Rudern vorkommenden Borstenformen sind denen der vorhergehenden Art sehr ähnlich und kommen in der gleichen Verteilung vor. Die Grätenborsten (Fig. 105) haben ein langes Endglied, welches bei stärkster Entwicklung etwa die Hälfte der Gesammtlänge der Borsten einnimmt. Die Sichelborsten (Fig. 104) tragen am Ende ein kurzes, dem der *Nereis rigida* ähnliches, aber etwas schlankeres Anhangsglied mit ziemlich langen Wimpern.

Die Paragnathenbewaffnung des Rüssels, welcher nur im eingezogenen Zustande daraufhin untersucht werden konnte, besteht aus conischen

Paragnathen, welche am maxillaren Rüsselabschnitt ziemlich gross, am oralen Abschnitt kleiner sind, und verhält sich folgendermassen:

Maxillaria:
- i. Ein einzelner ziemlich grosser Zahn.
- ii. Schräger, schwach gebogener, mehrreihiger Streifen.
- iii. Kleine längliche aufrechte Gruppe (7 Zähnchen).
- iv. Dreieckiger Haufen.

Oralia:
- v. Fehlen.
- vi. 4 oder 5 in einem stehenden Kreuz.
- vii. 3 in einer Querreihe.
- viii. Fehlen.

Die Kiefer sind braun, mässig gebogen und haben 7 Zähnchen.

Fundort:
No. 132. Depth 115 fms.
Lat. Sta. Cruz N.
Long. " W.

Nereis articulata Ehlers.

Florida-Anneliden, 1887, p. 114, Taf. 36.

Ich konnte nur ein einziges hinten verstümmeltes Exemplar mit 61 Segmenten und von ca. 4,5 cm. Länge untersuchen, welches ich als die vorstehende Art erkannt habe. Das Exemplar stimmt im Allgemeinen mit der Originalbeschreibung überein, doch lassen sich derselben noch einige ergänzende Bemerkungen hinzufügen. Die Gliederung der Fühler und Buccalcirren ist bei dem vorliegenden Tier wohl zufolge weniger guter Erhaltung lange nicht so deutlich wie bei dem Originalexemplar; der längste (obere hintere) [bei letzterem war er verloren gegangen] Buccalcirrus reicht über die 9 bis 10 ersten Segmente nach hinten. Die Augen von denen die vorderen wenig grösser als die hinteren sind, stehen hier noch enger zusammen jederseits als bei dem Original im Gegensatz zu der Angabe der Augenstellung im Text (*loc. cit.* p. 114).

Über die Ruder ist noch folgendes ergänzend zu bemerken: 1stes und 2tes Ruder sind einästig mit oberer und unterer Lingula und einer hinteren kegelförmig-schlanken Lippe versehen; diese hintere Lippe tritt an den folgenden zweiästigen Rudern in gleicher Lage an dem wie das 1ste und 2te Ruder gestalteten dorsalen Ruderast auf. Der Ventralast der mittleren Ruder enthält ausser einer unteren Lingula eine hintere schlank kegelförmige Lippe, welche nicht bis ans Ende des ventralen Ruderastes reicht. An den vorderen Rudern, ungefähr bis zum 27ten, von wo ab die Lingula des ventralen Ruderastes in die schlanke Form der hinteren Ruder übergeht, ist diese Lingula bei dem vorliegenden Exemplar ein kurzer, dicker, stumpfkegelförmiger Höcker von etwa halber Ruderastlänge (vielleicht Alters- oder Geschlechtsdifferenz?); weiter nach hinten, wo die Lingula des Ventralastes schlank kegelförmig wird, mag sie $\frac{2}{3}$ der Länge ihres Ruderastes erreichen. Ob eine Gliederung der Dorsalcirren tatsächlich auch vorhanden ist, lässt sich schwer entscheiden, jedenfalls besteht der Anschein einer solchen.

Die Kiefer tragen an ihrer Schneide etwa 16 Zähnchen; die Paragnathenbewaffnung des Rüssels, der nur im eingestülpten Zustande untersucht werden konnte, besteht, soweit sich dies unter den gegebenen Verhältnissen feststellen liess, aus 3 hellbraunen Paragnathen, welche am oralen Rüsselabschnitt eine ventrale Querreihe bilden.

Eine gleiche Paragnathenbewaffnung des Rüssels findet sich bei *Nereis tridentata* Webster (Annelida Chaetopoda of New Jersey, 32d Ann. Rept. N. Y. State Mus. Nat. Hist., 1879, p. 113. Keine Figuren), welche vielleicht mit der *Nereis articulata* zusammenfällt, und deren Name dann gemäss seiner Priorität für den Artnamen *articulata* eintreten müsste.

Fundort:
Nr. 269. Depth 124 fms.
Lat. St. Vincent N.
Long. " W.

NEPHTHYDIDAE.

Nephthys phyllocirra Ehlers.

Florida-Anneliden, 1887, p. 131, Taf. 38.

Einige wenige Exemplare einer Nephthys, welche hinten sämtlich verstümmelt sind, entsprechen der Beschreibung dieser Art. Es lässt sich der Beschreibung noch hinzufügen, dass feilkerbige Borsten auch am Umfange des ventralen Ruderastes stehen und dass am dorsalen Ruderast noch eine vordere häutig blattartige Lippe vorkommt, welche fast eben so lang aber niedriger als die hintere dorsale Lippe ist. Die vorliegenden Tiere sind grösser als die der Originalbeschreibung zu Grunde gelegten; das Grösste hat mit 37 erhaltenen Segmenten am 1sten Segment eine Breite von 0,5 cm. und ist 2,9 cm. lang.

Fundort:
Nr. 336. Depth 197 fms.
Lat. 38° 21′ 50″ N.
Long. 73° 83′ W.

Nr. 44. Depth 192 fms.
Lat. 40° 51′ N.
Long. 70° 58′ W.

Nr. 356. Depth 44 fms.
Lat. 40° 25′ 35″ N.
Long. 71° 10′ 30″ W.

Nr. 345. Depth 71 fms.[1]
Lat. 40° 10′ 15″ N.
Long. 71° 4′ 30″ W.

SYLLIDAE.

Branchiosyllis oculata Ehlers.

Florida-Anneliden, 1887, p. 148, Taf. 39.

Diese Art fand sich in einem einzigen Exemplar von 0,5 cm. Länge vor, das auf einem Kalkschwamm ausgestreckt haftete, und welches in allen äusserlich erkennbaren Einzelheiten mit der Originalbeschreibung übereinstimmt.

Fundort:

Nr. 287. Depth $\frac{7\frac{1}{2}}{50}$ fms.
Lat. Barbados N.
Long. " W.

HESIONIDAE.

Castalia hesionoides, sp. nov.

Taf. 6, Fig. 106–109.

Diese Art liegt in 3 nicht besonders erhaltenen Exemplaren vor von im Allgemeinen gelblicher oder gelblichgrauer Färbung; auf der ventralen Medianpartie zeigt sich bei den einzelnen Tieren mehr oder minder deutlich eine dunkelbraune Pigmentierung. Das grösste Exemplar ist ungefähr 2,2 cm. lang bei einer grössten Breite von 0,3 cm. ohne Ruder. Der Körper ist kurz und von einigermassen gleicher Breite, ventral abgeplattet, auf der Dorsalseite, namentlich im Bereiche des Pharynx gewölbt; die grösste Breite des Körpers findet sich in seinem vorderen Längendrittel, worauf alsdann eine allmähliche Abnahme der Breite nach hinten stattfindet. Die Segmente in der Mitte des Körpers sind nur wenig breiter als hoch, und ihre ventralen Seitenränder besonders in der hinteren Körperhälfte kantig gegen die Flanken des Körpers abgesetzt.

Es sind 16 rudertragende Segmente vorhanden hinter den durch jederseits 4 Paar Fühlercirren repraesentierten Buccalsegmenten; ein 17tes Segment wird gekennzeichnet durch ein rudimentäres Ruder, auf welches noch ein kegelförmiges Endstück mit der Afteröffnung folgt, so dass doch zum mindesten im Ganzen eine Zahl von 18 Segmenten angenommen werden kann. (Die Analcirren eines möglicherweise vorhandenen 19ten Segments sind nirgends erhalten.)

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[1] War ganz eingetrocknet.

Der Kopflappen (Fig. 106) hat wie anscheinend auch das ganze Tier grosse Ähnlichkeit mit *Castalia longicirrata*, Treadwell[1]; er ist querbreiter, etwas rechteckig gestaltet, mit abgerundeten Seitenflächen, etwa 2mal breiter als lang und durch eine Medianfurche in zwei Seitenhälften geteilt. Der Kopflappen trägt jederseits ein Paar brauner, durch Einlagerung einer Linse halbmondförmig erscheinender Augen, von denen die vorderen mindestens 2mal grösser sind als die hinteren. Nach hinten läuft der Kopflappen in 2 seitliche Fortsätze aus wie bei *Castalia longicirrata.* Von den 2 Paar Anhängen des Kopflappens entspringen die zarten fadenförmigen Fühler der Medianfurche genähert am Vorderrande des Kopflappens (ein einziger erhaltener ist nachträglich leider abgefallen); die Fühler sind etwas länger als der Kopflappen und am Ende ziemlich plötzlich in eine feine Spitze verdünnt. Die Palpen (Fig. 107) sind zweigliederig, mit einem stärkeren cylindrischen Basalglied und einem spitzkegelförmigen Endglied versehen; sie entspringen unten an den seitlichen Vorderecken des Kopflappens und sind etwas länger als dieser, ihr Endglied ist etwa $\frac{2}{3}$ so lang wie das Basalglied.

Die untere Begrenzung des Mundes, dessen Rand durch Einkerbungen gefaltet ist, wird durch ein abgestumpft-dreieckiges Mundpolster gebildet, dessen hintere Grenze etwa in der Höhe des 1sten Ruders liegt; an das Mundpolster schliesst sich hinten eine breite, flache, mediane Bauchfurche an.

Vier Paare von Fühlercirren stehen jederseits am Körper hinter dem Kopflappen, von denen die zwei hinteren Paare, wie die vorderen cylindrische, aber stärkere und längere Basalglieder haben. Jeder Fühlercirrus enthält an seiner Basis eine kurze schwarze Acicula.

Die rudertragenden Segmente sind (ventral gemessen) kaum länger als breit und ihre Ruder etwa so lang wie der Körper breit ist. Die Ruder sind schlank-kegelförmig gestaltet, seitlich ein wenig zusammengedrückt und einästig, am Hinterkörper verhältnismässig etwas länger als vorn. Die Zweiästigkeit der Ruder (Fig. 108) ist noch angedeutet vorhanden darin, dass das Basalglied des Dorsalcirrus eine kurze feine Acicula enthält. Eine starke schwarze Acicula endigt in der Ruderspitze, oberhalb welcher zuweilen ein ganz kurzer lippenartiger Fortsatz erkennbar ist (?). Der Dorsalcirrus ist beträchtlich lang und fadenförmig, entspringt hart an der Wurzel des Ruders auf diesem mittels eines starken, kegelförmigen Basalgliedes und ist ungefähr doppelt so lang wie der Körper breit ist. Der zarte fadenförmige Ventralcirrus entspringt etwa ein Drittel der Ruderlänge von der Ruderbasis ab und reicht so weit wie die Borsten.

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[1] Treadwell, Polychaetous Annelids of Porto Rico, 1902, p. 185.

Die Borsten (Fig. 109) treten als schmales senkrechtes Bündel unterhalb der Ruderspitze aus und kommen nur als zusammengesetzte Borsten vor. Die gelben Borsten haben einen längs- und quergestreiften Borstenschaft, welcher ein schmales, am Ende zweizähniges Endglied trägt, welches an seiner concaven Kante ganz fein gesägt ist.

Die vorliegende Art steht der *C. longicirrata* Treadwell (*loc. cit.*) nahe durch ihre geringe Segmentzahl wie in der Bildung des Kopflappens, weicht von dieser aber ab durch die Einästigkeit der Ruder und die Form der Borsten. Eine ähnliche Bildung, wie sie Treadwell (*loc. cit.*, Fig. 2) bei *C. longicirrata* als mediane Verlängerung des Kopflappens erwähnt, findet sich bei *C. hesionoides* ebenfalls, aber viel schwächer, in Form einer queren, abgerundet vorspringenden niedrigen Hautfalte vorne unterhalb des Kopflappens.

Fundort:

Nr. 228. Depth 399 fms.
Lat. Barbados N.
Long. " W.

Nr. 218. Depth 164 fms.
Lat. Sta. Lucia N.
Long. " W.

GLYCERIDAE.

Glycera oxycephala Ehlers.

Florida-Anneliden, 1887, p. 182, Taf. **41**.

Wenige sämtlich hinten verstümmelte Exemplare gehören zu dieser Art. Die Vermutung von Ehlers (*loc. cit.*, p. 122), dass dieser Art statt 2er 4 Fühler an der Spitze des Kopflappens zukommen möchten, lässt sich dahin bestätigen, dass bei einem Exemplar von den ursprünglich vorhandenen 4 Fühlern noch 3 erhalten waren. An der Figur der Capillarborsten in der Originalbeschreibung ist der Besatz dieser Borsten mit feinen Sägezähnchen fortgelassen worden.

Fundort:

Nr. 276. Depth 94 fms.
Lat. Barbados N.
Long. " W.

Nr. 175. Depth 611 fms.
Lat. Dominica N.
Long. " W.

Nr. 298. Depth 128 fms.
Lat. Barbados N.
Long. " W.

Goniada emerita Aud. et Edw. quinquelabiata var. nov.

Ein einziges hinten verstümmeltes Exemplar von *Goniada* mit 170 Segmenten und von ca. 13 cm. Länge habe ich als Varietät der in demselben Gebiet vorkommenden Stammform[1] aufgeführt, mit welcher das Tier im Allgemeinen übereinstimmt, aber durch den Besitz einer hinteren dorsalen blattförmigen Lippe an den zweiästigen Rudern hauptsächlich abweicht. Über das vorliegende Tier ist noch folgendes anzuführen (vergl. die Stammform bei Ehlers, Borstenwürmer, 1864–68, p. 718): Der nur zum kleineren Teile ausgestülpte Rüssel trägt an seinem vorgestülpten Abschnitt rechts 19, links 15½ winkelförmige Kieferspitzen; die eigentlichen Hauptkiefer liegen in diesem Falle ungefähr in der Gegend des 26ten, das Ende des musculösen Kieferträgers etwa im 61ten Segment. Die beiden Hauptkiefer sind 4zähnig, indem die Zähne ventralwärts an Grösse abnehmen (am linken Kiefer ist der 4te Zahn wohl nur abgebrochen). Vor den Kiefern steht ein Kranz von 18 grossen Papillen, es sind etwa 48 kleine Nebenkiefer von verschiedener Grösse vorhanden.

Von den Rudern ist das 33te das erste 2ästige und mit dem 84ten Ruder beginnt die Zone der verlängerten hinteren Ruder, die hier etwa um ⅓ weiter vorragen als die vorhergehenden. Die Ruder sind, ehe sie zweiästig werden, gebaut wie bei der Stammform aus dem Mittelmeer; mit dem Auftreten der zweiästigen Ruder entwickelt sich allmählich am dorsalen Ruderast eine hintere blattförmig zugespitzte Lippe, welche nicht die Entwicklung der vorderen dorsalen Ruderlippe erreicht und nur ⅔ so lang wie diese wird. Die Färbung dieses Exemplars ist ventral heller oder dunkler graurötlich, auf der Dorsalseite rötlichbraun, an der hinteren Hälfte des Tieres, wo die Bauchseite dunkler gefärbt ist, durch helle Segmentgrenzen quer gebändert, Cirren und Lippen sind grösstenteils dunkel gefärbt.

Fundort:

Nr. 12.	Depth 466 fms.
	Lat. 39° 50′ 45″ N.
	Long. 70° 71′. W.

CHLORAEMIDAE.

Stylarioides collarifer Ehlers.

Florida-Anneliden, 1887, p. 161, Taf. 43.

Fundort:

Nr. 256.	Depth 370 fms.	Nr. 259.	Depth 159 fms.
	Lat. Grenada N.		Lat. Grenada N.
	Long. " W.		Long. " W.

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[1] Ehlers, Florida-Anneliden, 1887, p. 124.

SCALIBREGMIDAE.

Oncoscolex (Eumenia) heterochaetus, sp. nov.

Taf. 6, Fig. 110–112.

Es liegen mir 4 Exemplare einer zu dieser Gattung gehörenden Art vor, welche mit der *Eumenia glabra*[1] aus dem gleichen Gebiet grosse habituelle Ähnlichkeit haben, von dieser sich aber unterscheiden durch das Vorhandensein deutlicher, wenn auch manchmal wenig hervortretender Borstenhöcker und die verschiedenartige Gestaltung der Borsten der 3 vordersten Borstensegmente gegenüber den übrigen Borstensegmenten.

Die vorliegenden Tiere haben eine graugelbliche Färbung und gleichen in ihrer Körperform sehr der *Eumenia glabra*; eines der Tiere, welche von ziemlich gleicher Länge sind, hat eine Länge von 3,3 cm. und eine grösste Dicke von 0,6 cm. Der Körper ist gestreckt sackförmig, nach vorn etwas verjüngt, am Hinterende in einen gegen die Bauchfläche etwas eingebogenen dünneren Abschnitt stark kegelförmig verschmälert. Die Dorsalseite des Körpers (Fig. 110) ist gewölbt, die Ventralfläche eben und mit einer tiefen Medianfurche versehen, welche gegen das Vorderende und hinten etwa am Anfang des umgebogenen Körperendteils ebenfalls verflacht. Die Dorsalfläche der vordersten Segmente (Fig. 110) schaut nach vorn, indem das Vorderende des Körpers ventralwärts etwas eingekrümmt ist und an der Dorsalseite fast senkrecht abgestutzt erscheint. Die Körperoberfläche ist je nach dem Contractionszustande der Tiere rauher oder glatter, und wenn stark ausgedehnt, ziemlich glatt und mit einer feinen Querfurchung versehen; eine deutliche Querfurche, die von feinen Hautrauhigkeiten begleitet wird, verläuft auch bei expandierter Haut hart vor den Parapodien vorbei, welche in der Verlängerung jener Rauhigkeiten liegen.

Ist die Haut contrahiert, so bildet sie starke, wiederum quergerunzelte Querfalten, von denen an jedem Segment drei vorkommen. Die mittleren Segmente des Körpers, welcher im Ganzen etwa 40–50 Segmente enthält, sind je nach der Contraction der Haut verschieden, im contrahierten Zustande etwa 5mal, im ausgedehnten Zustande etwa 3mal breiter als lang.

Der Kopflappen ist von vorn gesehen abgestumpft herzförmig, etwa so lang wie vorne breit, vorne etwa 3½mal so breit wie hinten und mit einer ganz schwachen medianen Längsfurche versehen. Die beiden

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[1] Ehlers, Florida-Anneliden, 1887, p. 169, Taf. 45.

Fühler sind eikegelförmig und von der Länge des Kopflappens. Das erste, borstenlose Segment umgiebt den Kopflappen kragenartig von oben und von den Seiten und ist am dorsalen Rande einige Male eingefaltet; die subterminal ventral gelegene Mundöffnung wird vom 1sten und 2ten Segment begrenzt.

Vom 2ten Segment an (Fig. 110) treten dorsale und ventrale Borsten und senkrecht übereinander stehende Parapodien auf, welch letztere am 2ten bis 4ten Segment anders gestaltet sind als weiter hinten. Die Borstenhöcker des 2ten bis 4ten Segments sind bedeutend grösser als an den hinteren Segmenten, polsterartig eiförmig, senkrecht oder schräg nach vorn und oben gerichtet und sind um ihre doppelte Länge von einander getrennt; oben und unten werden die Borstenhöcker von Falten begrenzt. Die Parapodialhöcker nehmen am 2ten bis 4ten Segment successive an Grösse etwas ab. Die Borsten stehen am dorsalen Borstenhöcker an dessen oberem und hinterem Umfange und bilden einen nach vorn und unten offenen Bogen; ventral stehen die Borsten in dieser Weise nur am 2ten Segment, am 3ten und 4ten bilden sie einen flachen vorn kaum concaven Bogen am Hinterrande des Ruderpolsters. Vom 5ten Segment an haben die Parapodienhöcker, etwa nur mit Ausnahme der vordersten wenig grösseren, die gleiche Form, Grösse und Stellung und bilden senkrechte kleine eiförmige Polsterchen oder Höcker, auf denen die Borsten in einer medianen, senkrechten, undeutlich einzeiligen Längsreihe stehen. Die Borstenpolster sind je nach dem Contractionszustande der Haut etwas näher oder weiter von einander entfernt, am Vorderkörper weiter von einander getrennt als am Mittelkörper, zuweilen nur durch eine Furche von einander geschieden. Bei starker Ausdehnung der Körperwände, wenn dieselben fast glatt erscheinen, springen die Borstenhöcker nur ganz wenig über die Körperoberfläche vor.

Die Borsten des 2ten bis 4ten Segments (Fig. 111) sind stärker als die der Mittelsegmente, etwas glänzend, steif und braun, schwach klauenartig gebogen und endigen in eine einfache Spitze. Die Borsten der mittleren Körpersegmente (Fig. 112) sind feine zarte, einfache, biegsame Haarborsten, welche fast alle von einem wohl aus Fremdkörpern bestehenden, scheidenartig erscheinenden Überzuge bedeckt waren, welcher auch an den ebenfalls an sich glatten Borsten der vordersten Segmente zu bemerken war. Gegabelte Borsten wie sie bei *Eumenia glabra* vorkommen, habe ich bei der vorliegenden Art nicht auffinden können, doch mögen dieselben vielleicht durch Abbrechen verloren gegangen sein.

An den mittleren Segmenten findet sich zwischen den Parapodien dem dorsalen Parapodium genähert in Gestalt einer senkrechten Spalte die segmentale Genitalöffnung.

Ich bin nicht sicher, ob die vorliegende Art nicht möglicherweise doch mit der *Eumenia glabra* Ehlers (*loc. cit.*) identisch ist trotz der angeführten Abweichungen. Das ausdrücklich bei *Eumenia glabra* hervorgehobene Fehlen der Borstenhöcker könnte vielleicht auf eine sehr starke Ausdehnung des Originalexemplars zurückzuführen sein. Es mag hier noch bemerkt werden, dass an den mir vorliegenden Tieren an dem gleichen Exemplar je nach der Spannung der betreffenden Hautpartie die Körperoberfläche glatt oder gerunzelt erscheinen kann. Die verschiedenartige Form der Borsten an den vordersten Segmenten gegenüber den Borsten am Mittelkörper wird von *Eumenia glabra* nicht erwähnt. Die kegelförmige Verjüngung des hinteren Körperendes ist beiden Arten eigen und jedenfalls keine individuelle Bildung.

Fundort:

Nr. 228. Depth 785 fms.
Lat. St. Vincent N.
Long. " W.

Nr. 226. Depth 424 fms.
Lat. St. Vincent N.
Long. " W.

MALDANIDAE.

Clymene cirrata Ehlers.

Zwei nur in vorderen Bruchstücken von 10 und 11 Segmenten erhaltene Tiere gehören augenscheinlich der vorstehenden Art an. An den Vorderrändern einiger Segmente des einen Exemplars (5tes bis 8tes) erkennt man die Andeutung einer minimalen Kragenbildung, welche jedoch wohl nur durch das infolge starker Zusammenschiebung der Segmente entstandene Übergreifen der letzteren auf das nächstvordere Segment zu erklären ist. In der Beschreibung von Ehlers[1] (vergl. Fig. 12) muss es jedenfalls heissen "zweimal so lang wie hinten breit" bezüglich des Kopflappens, anstatt "2mal so breit wie lang."

Fundort:

Nr. 334. Depth 395 fms.
Lat. 38° 20′ 30″ N.
Long. 73° 26′ 40″ W.

Nr. 336. Depth 137 fms.
Jahr 1880.

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[1] Ehlers, Florida-Anneliden, 1887, p. 183, Taf. 46, Fig. 12.

Praxilla gracilis Sars.

Taf. 6, Fig. 113.

Es liegt mir nur ein vorderes mit Kopf versehenes Bruchstück einer *Praxilla* vor, welches bei einer Länge von 2,3 cm. 10 Segmente enthält und in der Gesamtform, in der Bildung des Kopflappens wie in dem Besitz starker und anders als an den hinteren Segmenten gestalteter Haken am 2ten bis 4ten Segment mit *Praxilla gracilis* übereinstimmt. Einige kleine Abweichungen von der nordischen Art lassen das westindische Exemplar als Varietät der ersteren erscheinen. Die ventralen Haken der drei ersten Borstensegmente sind wie bei *Praxilla gracilis* glatt,[1] aber breiter und bedeutend stärker gerundet-gebogen, doch nicht bis zu einem Winkel von 90° (Fig. 113). Die ventralen Haken der mittleren Segmente sind der Abbildung Malmgren's[2] sehr ähnlich, aber ihr Endhaken ist über einen Winkel von 90° gegen den Schaft zurückgebogen und trägt auf dem Scheitel vor der Endspitze 5 kleinere Zähne.[3]

Fundort:
Nr. 336. Depth 197 fms.
Lat. 33° 21′ 50″ N.
Long. 73° 32′ W.

Praxilla praetermissa Malmgren.

Ein kleines hinten verstümmeltes Exemplar mit 8 borstentragenden Segmenten von 1,9 cm. Länge und 0,1 cm. Breite gehört offenbar dieser Art an und stimmt im Allgemeinen mit der Beschreibung Malmgren's[4] von dieser Art überein. Die vorderen Borstensegmente sind

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[1] Sars, Fauna littoralis Norvegiae, 1856, part 2, p. 15, Tar. **2**, Fig. 18–20.

[2] Malmgren, Annulata Polychaeta. Helsingfors, 1867, p. 100, Taf. **11**.

[3] Nach Untersuchung eines nordischen Exemplars aus der Collection von Römer & Schaudinn, 1898, ist hier noch nachträglich hinzuzufügen, dass das westindische Exemplar dieser Art bezüglich der Haken der 3 ersten Borstensegmente mit dem nordischen Tier übereinstimmt, indem letzteres an diesen Segmenten ebenso stark gebogene Haken trägt. Als minimale Abweichungen des westindischen Stückes von dem nordischen sind anzuführen, der etwas höhere Kopflappensaum des ersteren und allenfalls noch der ein wenig differierende Biegungsgrad der Haken der hinteren Segmente, so dass bei der grossen Übereinstimmung beider Tiere eine Hervorhebung des westindischen als einer unbedeutend differenten Varietät der nordischen Art letzterer gegenüber höchstens notwendig erscheint.

[4] Malmgren, Nordiska Hafs-Annulater. Ofv. k. vet. Akad. Förh., Stockholm, 1865, p. 191. Annulata Polychaeta. Helsingfors, 1867, p. 100, Taf. **11**, Fig. 62.

zum Teil noch gestreckter als bei Malmgren's Tieren und z. T. reichlich 3mal länger als breit. Die Hakenborsten der 3 vordersten Borstensegmente weichen etwas, wenn auch lange nicht in dem Masse wie bei *Praxilla gracilis* von denen der mittleren Körpersegmente ab in der Form, indem ihr Schaft schwächer, fast gar nicht gebogen und ihr Endhaken weniger stark, nur im rechten Winkel gegen den Schaft zurückgebogen ist.

Fundort:

Nr. 230. Depth 464 fms.
Lat. St. Vincent N.
Long. " W.

Maldane cuculligera Ehlers.

Eine Reihe von Exemplaren sind die Vertreter dieser Art. Zu der Beschreibung derselben[1] ist noch zu bemerken, dass die in der Abbildung von dem Originalexemplar an der ventralen Grenze des 6ten zum 7ten Segment sichtbaren halbmondförmigen Eindrücke nicht immer so deutlich wie dort und zuweilen nicht erkennbar sind, wohl im Zusammenhange mit dem jeweiligen Contractionszustande der Tiere.

Fundort:

Nr. 334. Depth 395 fms.
Lat. 38° 20′ 30″ N.
Long. 73° 26′ 40″ W.

Nr. 364. Depth 129 fms.
Lat. 40° 1′ N.
Long. 70° 58′ W.

Nr. 337. Depth 740 fms.
Lat. 38° 20′ 8″ N.
Long. 73° 23′ 20″ W.

Nr. 343. Depth 732 fms.
Lat. 39° 45′ 40″ N.
Long. 70° 55′ W.

Nr. 259. Depth 159 fms.
Lat. Grenada N.
Long. " W.

Maldane collariceps, sp. nov.

Taf. 6, Fig. 114–120.

Es liegen mir von dieser Art vier Exemplare vor, von denen 3 nur vordere Bruchstücke sind. Das vollständig erhaltene und bei weitem grösste Exemplar hat eine Länge von ca. 18 cm. und ist am Buccalsegment ca. 0,45 cm. breit. Die Färbung der Tiere ist graugelblich. Die vorliegende Art hat die Bildung des Kopflappens, dessen hoher Saum in Zähne gespalten ist, mit mehreren anderen Arten gemeinsam,

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[1] Ehlers, Florida-Anneliden, 1887, p. 180, Taf. 46, Fig. 2.

wie z. B. der *Maldane biceps* Sars Malmgren,[1] die Eigenschaft, dass auch der Saum der Analplatte in Zähne ausläuft, gemeinsam mit der *Maldane coronata* Moore (*gotoi* Izuka)[2] unterscheidet sich von der letzteren jedoch durch den Besitz eines hohen Hautkragens, welcher auf der hinteren Grenze das Buccalsegments entspringt und, nach vorn gerichtet, das Buccalsegment mehr oder minder einhüllt (Fig. 114).

Der vollständig erhaltene Körper des Exemplars, welches der Beschreibung hier hauptsächlich zu Grunde gelegt ist, enthält 19 borstentragende Segmente, mit dem Buccalsegment und dem Analsegment, wenn das hinter dem letzten Borstensegment liegende Körperende als ein Segment angesehen wird, 21 Segmente.

Der Kopflappen (Fig. 114) ist, wie schon vorher bemerkt, dem der *Maldane biceps* Sars sehr ähnlich gestaltet und besteht aus einer rundlich-ovalen Platte, welche unter einem Winkel von fast 90° bis zu 45° je nach dem Umständen zur Körperlängsachse geneigt sein kann; die Kopflappenplatte ist etwa $1\frac{1}{2}$mal länger als breit, nur am Vorderrande mehr grade abgestutzt. Die hinteren $\frac{3}{4}$ etwa des Kopflappens werden durch einen hohen aufrechten Randsaum eingefasst, welcher jederseits, wieder durch das Auftreten eines bis zum Grunde gehenden Einschnitts auf halber Kopflappenlänge in einen hinteren halbkreisförmigen unpaaren Abschnitt und zwei kleinere seitliche Abschnitte zerfällt. Der unpaare hintere Lappen des Kopflappensaumes trägt am freien Rande in einem Falle etwa 27, in einem andern Falle 14 oder 15 zugespitzte Zähne, die paarigen Seitenlappen desselben in einem Falle 5 und 8, in einem andern Falle je 5 Zähne, von denen zuweilen mehrere eine Gruppe bilden; die Zähne der Seitenlappen sind länger und spitziger als die des unpaaren Hinterlappens.

Das vordere als eine Art von plattenförmig gestaltetem Fühler aufzufassende Viertel des Kopflappens ist eine quere, gestreckt eiförmige, am Vorderrande mehr gradlinige Platte, welche nach hinten, durch tiefe Furchen gegen den übrigen Kopflappen abgesetzt, sich bis zur Mitte des Kopflappens in eine $\frac{1}{3}$ der Kopflappenbreite betragende, in der Längsachse des Kopflappens liegende Partie fortsetzt, welche wiederum vorne und seitlich durch Furchen gegen diejenigen Teile des Kopflappens abgesetzt sind, welche die Seitenlappen des Kopflappensaumes tragen. Diese letzteren seitlichen Kopflappenpartien werden hinten wieder durch Furchen begrenzt, welche vom seitlichen Einschnitt des Kopflap-

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[1] Malmgren, Nordiska Hafs-Annulater. Ofv. k. vet. Akad. Förh., Stockholm, 1865, p. 188. Annulata Polychaeta. Helsingfors, 1867, p. 98, Taf. **10**, Fig. 58.

[2] Proc. Acad. Nat. Sci. Phila. 1903, p. 483.

pensaumes kommend, sich mit der unteren vorderen und zugleich mit der medianen Grenzfurche dieser Seitenteile mitten auf dem Kopflappen vereinigen. Die mittlere, in der Längsachse des Kopflappens seitlich durch Furchen begrenzte Partie (hintere Verlängerung der Fühlerplatte) ist je nach den Umständen gegenüber der übrigen Kopflappenoberfläche mehr oder minder kielartig emporgewölbt. Von dem seitlichen Einschnitt des Kopflappensaumes zieht jederseits eine horizontale Furche über das Buccalsegment hinweg bis an das 2te Segment nach hinten.

Das Buccalsegment ist borstenlos und 2ringelig und nur ventral durch eine Furche gegen den Kopflappen abgegrenzt, sein vorderer Ringel ist nur ventral sichtbar und etwa 2mal länger als sein hinterer Ringel, das Buccalsegment insgesamt ist so lang wie der vordere Ringel des 2ten Segments. Auf der hinteren Grenze des Buccalsegments erhebt sich ein starker, hoher, ganzrandiger Hautkragen, der ungefähr in halber Höhe seitlich einen flachen Ausschnitt hat (Fig. 114) und so weit manschettenartig nach vorn reicht, dass je nach den Umständen die T-förmige Mundöffnung gerade noch bedeckt wird oder nur der hintere Ringel des Buccalsegments. Die Form der eigentlichen Körpersegmente ist drehrund und Segmentfurchen sind auf der Dorsalseite nur am 3ten oder 4ten Borstensegment noch deutlich ausgeprägt, an der Bauchseite werden die Segmentgrenzen etwa mit dem 7ten Borstensegment, mit dem Beginn der langen mittleren Körpersegmente, undeutlich. Das 2te bis 7te Segment ist 2ringelig, wobei der hintere Segmentringel etwa halb so lang ist wie der vordere. Das 2te Segment ist etwa 2mal breiter als lang; die folgenden bis zum 7ten sind wenig breiter als lang. Vom 8ten Segment an sind die Segmente nicht mehr 2ringelig und strecken sich in die Länge, sind am 10ten bis 15ten Segment am längsten und hier etwa 3mal länger als breit.

Die Borstenpolster treten an den vorderen Segmenten wenig hervor und sind hier schmale senkrechte Leisten; das 2te Segment trägt nur Haarborsten, vom 3ten Segment an treten ventrale Hakenpolster auf, welche am 5ten Segment noch kurz und etwa von gleicher Länge wie die Haarborstenpolster sind. Mit dem 6ten Segment werden die Hakenpolster beträchtlich (3- bis 5mal) länger als die kurzen Haarborstenpolster und die Borstenpolster nehmen zusammen fast die untere Hälfte der Segmenthöhe ein, während sie an den vorhergehenden Segmenten kaum das mittlere Drittel der Segmenthöhe ausfüllen. Vom 6ten Segment an (vorher schon angedeutet) treten die Borstenpolster viel stärker hervor und bilden starke gewölbte, durch gelbliche Drüseneinlagerung geschwellte Vorsprünge, welche das vordere Drittel der

Segmentlänge einnehmen. Das starke Hervortreten dieser Drüsenpolster ist offenbar sehr von dem Contractionszustande des betreffenden Tieres abhängig. Bei dem stark gestreckten grössten Exemplar sind sie viel schwächer als bei einem andern Tier und an den langen Mittelsegmenten des Körpers ziemlich undeutlich.

Die Haarborsten stehen auf ihren Polstern in doppelter, U-förmiger, nach oben geöffneter Reihe; die Borsten der vorderen Reihe sind kurz (Fig. 118) und mit einfacher, etwas gebogener, glatter und mit schmalem gestricheltem Saum versehener Spitze ausgestattet, die Haarborsten der hinteren Reihe (Fig. 117) sind länger als die der vorderen Reihe, durchaus glatt und in ihrem unteren Teil längs gestreift. An den mittleren Segmenten z. B. am 7ten, zeigen die beträchtlich langen Haarborsten (Fig. 119), welche etwa so lang wie die halbe Körperbreite sind, eine andere Form als vorn und endigen, indem sie in ihrem unteren Teil glatt und längsgestreift sind, in eine sehr lange, dünne, mit feinen Randsägezähnen gefiederte Spitze. Die Hakenborsten nehmen von vorn nach hinten an Zahl zu, in einem Falle finden sich am 3ten Segment 5, am 7ten etwa 27, in einem andern Falle an den entsprechenden Segmenten etwa 10 resp. 35, an einem der letzten Segmente des grössten Exemplars sind etwa 38 Hakenborsten auf dem Hakenpolster vorhanden. Die Haken sind denen der *Maldane cuculligera* Ehlers[1] sehr ähnlich und sind in einem Falle an den vorderen Segmenten nur insofern etwas abweichend von denen der hinteren Segmente (Fig. 120), als sie an ersteren spitzwinkelig, an letzteren rechtwinkelig bis stumpfwinkelig am Ende umgebogen sind gegen den Hakenschaft. Der Grad der Umbiegung der Hakenspitze wechselt übrigens ebenfalls bei den verschiedenen Individuen, so dass auch am Vorderkörper der Tiere schwächer gebogene Haken vorkommen können. Die Haken tragen unterhalb der Hakenspitze ein Büschel starrer Haare und auf dem Scheitel des Hakenkopfes 3 bis 4 Querreihen von Zähnen.

Der Abschluss des hinteren Körperendes (Fig. 115) wird durch eine fast senkrechte Analplatte, dicht vor welcher der After dorsal ausmündet, gebildet. Die Analplatte ist oval gestaltet, so hoch wie das Analsegment lang ist, etwa 1½mal höher als breit und am Rande von einem hohen Hautsaume umgeben, der seitlich in halber Höhe durch einen sanduhrförmigen Einschnitt wieder in einen unteren und oberen Abschnitt geteilt wird.

Der dorsale Teil des Analsaumes trägt ausser einigen kurzen Zähnchen jederseits am Rande 6 lange abgeplattete Fäden, von denen der längste

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[1] Ehlers, Florida-Anneliden, 1887, p. 176, Taf. 46.

am oberen Rande des seitlichen Saumeinschnittes steht und etwa so lang wie die Analplatte breit ist; die ventrale Hälfte des Analplattensaumes trägt am Rande etwa 9 kurze breit zugespitzte Zähne. Die Oberfläche der Analplatte ist durch einen Besatz mit kleinen punktförmigen Papillen etwas rauh und wird in ihrer längeren Achse von einer medianen niedrigen, kielartigen, schmalen Erhöhung durchzogen. In gleicher Höhe mit dem letzten Borstenpolster zieht auf der hinteren Hälfte des Analsegments eine seitliche weissliche Längsfalte von wahrscheinlich drüsiger Natur bis an die Wurzel des Analkragens.

Fundort:

Nr. 193. Depth 169 fms.
Lat. Martinique N.
Long. " W.

Nr. 239. Depth 338 fms.
Lat. Grenadines N.
Long. " W.

Nr. 334. Depth 395 fms.
Lat. 38° 20′ 30″ N.
Long. 73° 26′ 40″ W.

HERMELLIDAE.

Sabellaria (Pallasia) asteriformis, sp. nov.

Taf. 7, Fig. 129–138.

Die zu dieser Art gehörenden nicht besonders erhaltenen und sämmtlich hinten verstümmelten Tiere sind characterisiert durch den Besitz zweier Paleenkreise, zweier dorsaler Nackenhaken und zweier mächtiger Mundcirren neben der Mundöffnung.

Die Tiere haben alle den hintersten schwanzartigen Körperabschnitt verloren und haben eine graugelbliche oder bräunlichgelbe Färbung, die Fläche des Kopflappens ist bräunlich gefärbt. Die Tiere sind von ziemlich übereinstimmender Grösse und eines derselben, an welchem noch 12 hintere flösschentragende Segmente erhalten sind, hat eine Länge von 1,6 cm. und am Anfang des flösschentragenden Abschnitts eine Breite von ca. 0,35 cm.

Der Kopflappen (Fig. 129) bildet nebst dem ersten und 2ten Segment den vordersten Abschnitt des Körpers, darauf folgt ein zweiter aus 4 Segmenten bestehender Abschnitt vom 4ten bis 6ten Segment, auf den ein dritter Abschnitt folgt vom 7ten bis 12ten Segment. Der Kopflappen ist nur wenig schräg zur Körperachse gestellt, mehr oder minder kreisförmig begrenzt, auf seiner Vorderfläche mehr oder minder nach aussen vorgewölbt und bildet mit den 2 ersten Segmenten einen Körperabschnitt, welcher etwa so lang ist wie das 3te bis 7te Segment zusammen; das 2te Segment ist so lang wie das 3te, wenig breiter als hoch und 3mal breiter als lang.

Die inneren Paleen des Kopflappens stehen auf dessen unterer Hälfte der Peripherie des Kopflappens mehr oder minder genähert und bilden zwei kurze senkrechte Reihen von je 2 bis 3 Borsten, welche ihre Spitzen medianwärts gegeneinander kehren. Die inneren Paleen (Fig. 132) sind starr, braun und längsgestreift und überragen mit ihrer glatten, einfach nadelförmigen Spitze nur wenig die Kopflappenfläche. Die gelblich glänzenden äusseren Paleen (Fig. 131), durch einen weiten Zwischenraum von den inneren getrennt, stehen am Aussenrande des Kopflappens in einer Reihe, sind lang spatelartig gestaltet, blattartig flach, auf der Fläche quer- und längsgestreift, gegen das stumpfspitzige Ende nur wenig verbreitert und ganzrandig. Unmittelbar hinter den äusseren Paleen steht ein einreihiger Kranz von ca. 20 fadenförmigen Papillen, welche ventral am längsten und etwa von der Länge der Aussenpaleen sind; dieser Papillenkranz wird dorsal durch einen rechteckigen Ausschnitt unterbrochen, in dessen Grunde eine kegelförmige Papille von kaum der Ausschnitthöhe steht, und welcher seitlich von den Nackenhaken begrenzt wird (Fig. 129). Die Nackenhaken, von kupfergoldiger Färbung, sind in ihrem freien Teil stark und so gebogen, dass sie kieferartig teilweise übereinander greifen und ihre dorso-ventrale Verbreiterung senkrecht zur Körperlängsachse steht. Der in der Haut steckende Teil der Nackenhaken endigt etwa in der Höhe der hinteren Begrenzung der Mundöffnung, und ein wenig vor ihm das innere Ende der Innenpaleen.

Dicht hinter dem Papillenkranze des Kopflappens (Fig. 130) beginnt die ventrale Mundrinne, welche etwa halb so tief wie der Körper hoch ist und hinten etwas vor den Parapodien des 2ten Segments aufhört. Die Mundrinne wird vorn und seitlich etwa in halber Länge mit schlank fingerförmigen Papillen, einigen 20 in einfacher Reihe, umgeben. Die am Ende der Mundrinne gelegene Mundöffnung wird von 4 Hautfalten umgeben; ein wenig vor derselben entspringt an der dorsalen Decke der Mundrinne jederseits ein mächtiger, wurmförmiger Mundcirrus. Beide Mundcirren füllen in der Ruhelage, mehr oder minder regelmässig spiralig eingerollt, die Mundrinne ganz aus, würden im ausgestreckten Zustande aber weit, mindestens zur Hälfte, über die Aussenpaleen hinausragen.

Die Mitte etwa der hinteren Seitenhälfte der Mundrinne einnehmend, steht jederseits hart am Rande derselben das Parapodium des Buccalsegments in Gestalt eines dreieckigen Lappens, welcher vorn einen fadenförmigen Fortsatz trägt von der Länge der Mundrinnenbreite, welcher wiederum an seiner Wurzel aussen seitlich ein sehr feines Haarborstenbündel trägt. Das mit dem Kopflappen verschmolzene Buccalsegment ist durch eine undeutliche, namentlich ventral deutlicher angedeutete Furche, welche dicht hinter der etwas lippenartigen hinteren Begrenzung der Mundrinne verläuft, vom 2ten Segment getrennt; in der Verlängerung dieser Furche schräg nach oben und hinten stehen jederseits 2 Paare von durch eine niedrige Querfalte verbundenen Fadenfortsätzen, die Parapodien des 2ten Segments. Das ventrale Parapod steht etwas mehr dorsalwärts als das Buccalparapod, das dorsale etwa in $\frac{3}{4}$ der Körperhöhe. Der obere Fortsatz des Dorsalparapods von der halben Länge des unteren Fortsatzes ist die 1te Kieme, die drei übrigen Fortsätze der Parapodien des 2ten Segments, von denen der untere des ventralen Astes an seiner Wurzel ein ganz feines Haarborstenbündel trägt, reichen an Länge bis an das Buccalparapodium heran.

Das 2te Segment ist durch eine ganz schwache Faltenbildung gegen das 3te abgesetzt. Das 3te bis 6te Segment sind gleichartig, ungefähr gleich lang, so breit wie hoch und 5mal breiter als lang und tragen flossenartig zusammengedrückte Dorsalparapodien mit zweierlei Borsten. Vom 7ten Segment an, welches durch eine Einsenkung stark gegen das 6te abgesetzt ist, und mit welchem der dorsal stärker gewölbte dritte Körperabschnitt beginnt, treten dorsal spatelartig breite, flache Parapodien auf, die am freien Hinterrande kammförmige Haken tragen.

Die Kiemen von kegelförmiger, von vorn nach hinten etwas blattartig zusammengedrückter Gestalt, stehen am Vorderrande der Segmente, die des 3ten etwas mehr einwärts als die übrigen, erreichen am 8ten Segment ihre grösste Länge (mehr als die halbe Körperbreite) und nehmen weiter nach hinten an Länge wieder ab.

Die Parapodien des Buccal- und des 2ten Segments enthalten nur feine Haarborsten, die mit ganz kurzen feinen Härchen bedeckt sind. An den dorsalen Parapodien des 3ten bis 6ten Segments finden sich 2 Formen von Borsten in zwei senkrechten Reihen, die jede nur wenige, 3 bis 6 Borsten enthält. Die Borsten der vorderen Reihe (Fig. 133) sind paleenartig mit eilanzettlich verbreitertem und am freien Ende grade abgestutztem und hier kammartig fein zerschlitztem Endteil versehen; die Borsten der hinteren Reihe sind (Fig. 134) kurze, feine, schwach gebogene Haarborsten mit feinem Härchenbesatz in ihrer Aussenhälfte. Ventral finden sich an diesen Segmenten (Fig. 135) haarförmige Borsten, welche in ihrer Aussenhälfte mit kurzen Härchen an der Oberfläche bedeckt sind.

Am dritten Körperabschnitt finden sich dorsal nur kammförmige Haken und ventral zweierlei Haarborsten. Die breiten Dorsalparapodien dieses Abschnitts decken sich von vorn nach hinten etwas dachziegelig, erreichen am 8ten Segment ihre stärkste Entwickelung und nehmen von da nach hinten an Grösse ab. Die in senkrechter Reihe am Hinterrande dieser Dorsalparapodien stehenden Haken (Fig. 137) sind gestreckt und ziemlich schmal und tragen an ihrem nach vorn schauenden freien Rande 8–9 scharfe Zähne. Am unteren Ende des Querwulstes, welcher das dorsale Hakenparapod trägt, entspringt das ventrale Parapod als rundlicher Höcker, welcher ein einwärts gerichtetes dünnes Haarborstenbündel und hinter diesem eine fadenförmige Papille von der halben Länge der Borsten trägt. Die ventralen Borsten sind einfach haarförmige, glatte Borsten und ebensolche Borsten (Fig. 136), die aber auf einer Seite dicht mit blattförmigen lanzettlichen Sägezähnen besetzt sind.

Von der Körperform der Tiere im Allgemeinen ist noch zu sagen, dass fast überall an der Dorsalseite eine mediane Partie von den Seitenteilen zu scheiden ist, was ventral nur am 3ten Körperabschnitt, der auf der Dorsalseite median ziemlich stark vorgewölbt ist, deutlich ist.

Die Röhren (Fig. 138), in welchen die Tiere steckten, sind an der Innenseite glatt, drehrund, der Stärke des Tieres entsprechend weit, und dickwandig; die Wandstärke der Röhre, welche innen von einer glänzenden braunen, dünnen organischen Schicht ausgekleidet ist, und im Übrigen aus feinen Kieskörnern, Schalen u. s. w. zusammengesetzt ist, ist ziemlich verschieden, so dass die Röhre aussen mehr oder minder cylindrisch, aber auch abgeplattet (bis 2mal höher als breit) sein kann.

Es ist möglich, dass die vorliegende Art mit der *Sabellaria varians* von Porto Rico[1] zusammenfällt, welche ähnliche Paleen zu haben scheint und ebenfalls zwei grosse Mundcirren besitzt; nach der ungenügenden Beschreibung dieser Art ist es nicht möglich, die *Sabellaria asteriformis* mit ihr zu identificieren. Die Abbildung Treadwell's (*loc. cit.*, Fig. 81) von einer geblätterten Haarborste der hinteren Segmente stimmt jedenfalls nicht mit den entsprechenden Borsten der *S. asteriformis* überein. Da der Name *S. varians* schon von Webster für eine neue Sabellaria[2] mit 3 Paleenkreisen, welche offenbar nicht mit der

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[1] Treadwell, Polychaetous Annelids of Porto Rico, 1902, p. 210.

[2] Webster, Annelida Chaetopoda of the Virginian Coast. Trans. Albany Inst., 1879, vol. 9, p. 59, Plates 9, 10.

Treadwell'schen Art zusammenfällt, gebraucht wurde, muss ausserdem *S. varians* von Porto Rico mit einem anderen Namen bedacht werden.

Fundort:

Nr. 273. Depth 103 fms.
Lat. Barbados N.
Long. " W.

Sabellaria (Pallasia) tenera, sp. nov.

Taf. 7, Fig. 139-144.

Die Art wird nur durch ein vorderes Bruchstück eines Tieres vertreten von 1 cm. Länge und von 0,15 cm. Breite am Buccalsegment. Das Exemplar hat mit der vorhergehenden Art gemeinsam den Besitz zweier Paleenkreise und eines aus 4 Segmenten bestehenden zweiten Körperabschnitts, besitzt jedoch keine Nakenhaken und nicht die beiden mächtigen Mundcirren.

Der Körper des Tieres, das zu einer genaueren Beschreibung zu schlecht erhalten ist, ist dorsal gewölbt, fast 2mal breiter als hoch (so wenigstens innerhalb der 8 ersten postbuccalen Segmente) und ventral concav eingezogen. Die Entfernung von der Basis des äusseren Papillenkranzes am Kopflappen bis zum Hinterende der Mundrinne ist etwa so lang wie das 2te bis 5te Segment. Das 2te bis 5te mit kegelförmigen Dorsalparapodien versehene Segment ist je 5- bis 6mal etwa breiter als lang.

Es sind jederseits 5 vom Rücken nach unten an Grösse abnehmende innere Paleen (Fig. 139) von abgeflacht blattartiger Form und mit dünner gebogener Spitze vorhanden. Die äusseren Paleen (Fig. 140) haben die Form langer Haarborsten und tragen zahlreiche Querleisten, welche mit feinen Zähnen besetzt sind. Ausserhalb des äusseren Paleenkranzes stehen hart hinter demselben etwa 20 kegelfadenförmige Papillen von etwa ¼ der Paleenlänge. Die seitliche Begrenzung der Mundrinne hat keinen Papillenbesatz anscheinend und wird ausgefüllt durch 4 krausenartig zusammengefaltete häutige Falten, welche wohl die vordere Begrenzung der Mundöffnung bilden, welche wiederum hinten durch einen dicken queren glatten, lippenartigen Wulst begrenzt wird. Der äussere Paleenkranz wird dorsal durch eine Lücke unterbrochen, welche jederseits flankiert wird von einer am Ende in zwei Fäden gegabelten flachen, schlank-dreieckigen Papille, welche ihrerseits zugleich jedesmal unmittelbar hinter dem oberen Ende der inneren Paleenreihen steht.

Unmittelbar neben der hinteren Begrenzung der Mundöffnung steht am Rande der Mundrinne der ventrale Teil des Buccalparapodiums in Gestalt eines flachen kegelförmigen Lappens nebst einem etwa doppelt so langen fadenförmigen Cirrus, der an seiner Wurzel ein sehr feines Borstenbündel trägt; der dorsale Teil des Buccalparapodiums liegt hier (starke Contraction) durch eine Furche getrennt in halber Körperhöhe etwa hinter dem ventralen Teil und besteht in einem flachen Basallappen, welcher am Ende zwei kegelförmige Anhänge trägt. Die erste Kieme steht seitlich dorsal oben am Buccalsegment und reicht fast bis an die Wurzel des äusseren Papillenkranzes des Kopflappens.

Das 2te bis 5te Segment enthält nur Haarborsten, vom 6ten an finden sich dorsale Hakenflösschen und ventrale feine Haarborstenbündel. Die dorsalen Haarborstenbündel sind nach oben und hinten, die ventralen überall nach vorn und unten gerichtet. Die Hakenflösschen sind am 6ten bis 8ten Segment am grössten, am freien Rande etwa 2mal breiter als lang und nehmen dann nach hinten an Grösse ab.

Die Borsten verhalten sich folgendermassen: Am 2ten bis 5ten Segment finden sich dorsal ausser ganz kurzen glatten einfach haarartigen Borsten längere Haarborsten (Fig. 141), welche an ihrer dünnen Endspitze lanzettlich verbreitert und daselbst an ihrer Oberfläche mit kurzen Härchen bedeckt sind; die ventralen Borsten dieser Segmente sind (Fig. 142) fein haarförmig und in ihrer Endhälfte mit feinen Härchen aussen besetzt. Die ventralen Haarborsten der hinteren Flösschensegmente (Fig. 143) gleichen denen der vorigen Art und sind ausserdem mit feinen Blattzähnchen in ihrer Aussenhälfte besetzt, ein Teil dieser Ventralborsten erscheint glatt (ob nur durch Abnutzung?). Die dorsalen Haken der Flösschensegmente (Fig. 144) sind im Ganzen etwas halbmondförmig gebogen und tragen an ihrer Schneide etwa 10 ziemlich lange, anliegende Randzähne.

Für die Röhren dieser Art, welche zu mehreren mit einander vergesellschaftet und verkittet sind, hat das bei *Sabellaria asteriformis* hierüber Gesagte ebenfalls Gültigkeit.

Fundort:
Nr. 291. Depth 200 fms.
Lat. Barbados N.
Long. " W.

SPIONIDAE.

Aricidea alata Treadwell.

Ein einziges von dieser Art vorhandenes, ziemlich schlecht erhaltenes, hinten verstümmeltes Exemplar von ca. 1,9 cm. Länge und mit 40

Segmenten stimmt durchaus mit der Beschreibung Treadwell's[1] von dieser Art überein.

Fundort:

Nr. 149. Depth $\frac{60}{150}$ fms.
Lat. St. Kitts N.
Long. " W.

Prionospio steenstrupi Malm

Ein einziges, hinten verstümmeltes Exemplar von ca. 1,4 cm. Länge und 0,2 cm. Breite mit 41 erhaltenen Segmenten habe ich dieser Art untergeordnet mit Berücksichtigung einiger kleiner Abweichungen von der europäischen Form. Das vorliegende Exemplar hat jedenfalls grosse Ähnlichkeit mit der Malmgren'schen Art, so dass die Abweichungen von letzterer wohl zum Teil Eigentümlichkeiten localen Characters darstellen und einer Variation der Art Ausdruck geben. Das Kopfende des Tieres ist mehr kegelförmig und schnauzenartig etwas nach abwärts gebogen, als es die Abbildung Malmgren's[2] zeigt, was vielleicht nur auf einen anderen Contractionszustand zurückzuführen ist. Die Seitenfühler am Kopfende sind verloren gegangen, ebenso ein Teil der Kiemen, doch erscheint es mir wahrscheinlich, dass die Kiemen bei dem vorliegenden Tier, wo nur die eine lange gefranzte Kieme am 2ten Borstensegment und die beiden folgender Paare der kürzeren, zungenförmigen Kiemen erhalten sind, nach Form und Anordnung sich wie bei der Malmgren-'schen Art verhalten. Die Kieme des 2ten Borstensegments ist reichlich doppelt so lang wie der Körper breit ist.

Die blattförmigen Lappen der Parapodialäste sehen denen der nordischen Tiere sehr ähnlich, nehmen aber viel langsamer an Länge nach hinten zu ab als bei dieser. Die Parapodiallappen sind am stärksten entwickelt am 2ten bis 4ten Borstensegment (die dorsalen hier so lang wie die Kiemen), sind am 8ten Ruder noch beträchtlich gross und denen der Kiemensegmente ähnlich in der Form und erreichen in der hinteren Hälfte des vorliegenden Tieres allmählich die abgerundete Form und geringe Grösse, wie sie bei der nordischen Form (s. Malmgren) etwa mit dem 8ten Ruder schon erreicht wird.

Fundort:

Nr. 259. Depth 159 fms.
Lat. Grenada N.
Long. " W.

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[1] Treadwell, Polychaetous Annelids of Porto Rico, 1902, p. 202.

[2] Annulata Polychaeta. Helsingfors, 1867, p. 93, Taf. 9, Fig. 55.

AMPHARETIDAE.

Amage tumida Ehlers.

Diese Art wird durch wenige Exemplare vertreten, von denen das stärkste, das noch 9 von den hinteren haarborstenlosen Flösschensegmenten besitzt, eine Länge von ca. 1,7 cm. hat. Im Anschluss an die Beschreibung von Ehlers[1] mag noch eine Bemerkung über die verschiedenartige Gestaltung des Kopflappens, die auch bei anderen Ampharetiden vorkommt und den Habitus der Tiere ziemlich stark verändernd beeinflusst, hier angefügt werden. Die Dorsalfläche des Kopflappens bei Amage zeigt je nach dem Contractionszustande dieser Körperpartie ein verschiedenes Aussehen, indem die hufeisenförmige nach vorn concave Furche, wie sie von Ehlers beschrieben wird, und welche die vordere Stirnpartie des Kopflappens gegen dessen hinteren Teil abgrenzt, zuweilen (bei starker Ausdehnung) nicht oder kaum erkennbar ist, und im Zusammenhange damit die auf der Stirnpartie auftretenden Wülste ausgeebnet werden.

Fundort:

Nr. 345.	Depth 71 fms.	Nr. 149.	Depth $\frac{60}{150}$ fms.
	Lat. 40° 10′ 15″ N.		Lat. St. Kitts N.
	Long. 71° 4′ 30″ W.		Long. " W.

Ampharete sp?

Ein für nähere Bestimmung zu schlecht erhaltenes Exemplar gehört zu dieser Gattung.

Fundort:

Nr. 332. Depth 263 fms.
Lat. 35° 45′ 30″ N.
Long. 74° 48′ W.

Amphicteis procera Ehlers.

Von dieser Art fanden sich zwei hinten verstümmelte Exemplare vor, von denen das grössere mit 25 hinteren haarborstenlosen Flösschensegmenten 4,2 cm. lang ist. In der Originalbeschreibung dieser Art[2] wird die sogenannte Unterlippe als nicht deutlich ausgeprägt angegeben; bei den vorliegenden Tieren ist der ventrale Teil des Buccal-

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[1] Florida-Anneliden, 1887, p. 220.

[2] Ehlers, Florida-Anneliden, 1887, p. 227.

segments als deutliche Unterlippe ausgebildet (Folge eines anderen Erhaltungszustandes der Tiere).

Fundort:
Nr. 260. Depth 291 fms.
Lat. Grenada N.
Long. " W.

Amphicteis gunneri (Sars) Malmgren.

Ein paar Exemplare einer Ampharetide, welche alle die Kiemen verloren haben, zeigen so grosse Übereinstimmung mit dieser Amphicteis sens. Malmgr., dass ich sie derselben zugeordnet habe. Die Segmentzahl der Tiere ist übereinstimmend mit den Angaben Malmgren's,[1] in jedem Paleenbündel finden sich etwa 10 Paleenborsten. Es mag noch erwähnt werden, wie die Gestaltung des Kopflappens entsprechend dem verschiedenen Contractionszustande bei verschiedenen Tieren wechselt. Bei zweien der vorliegenden Tiere entspricht die Bildung der Kopflappenoberfläche der Abbildung Malmgren's (*loc. cit.*), bei dem dritten Exemplar ist im Gegensatz hierzu die sonst vertiefte Mittelpartie der "Stirnplatte" als erhabener nach vorn ein wenig vorspringender Wulst ausgeprägt und die Seitenteile der Stirnplatte sind vertieft. Vom ersten haarborstenlosen Flösschensegment an tritt bei den vorliegenden Tieren ein kurzer als rudimentäres Ruder oder Cirrus zu deutender Fortsatz auf in Übereinstimmung mit Malmgren (*loc. cit.*, Fig. 46) im Gegensatz zu Levinsen,[2] nach welchem dieser Fortsatz am 6ten Flösschensegment beginnt.

Es mögen noch 2 Punkte hier berührt werden, welche sich auf die Stellung der Gattung Amphicteis im Sinne Malmgren's zu Ampharete Malmgr. beziehen, und welche die Beschaffenheit der zwischen den beiden Kiemengruppen befindlichen dorsalen Körperpartie und den Beginn der Hakenflösschen am Körper betreffen. Bei Amphicteis soll eine Hautbrücke dorsal beide Kiemengruppen verbinden, und diese ist bei den vorliegenden westindischen Tieren in quadratischer oder rechteckiger Form deutlich vorhanden, in der Abbildung von Malmgren von *Amphicteis gunneri* aber ist dieselbe nicht erkennbar wie auch bei den anderen Amphicteis-Arten ebenda (*loc. cit.*, Taf. **19**); bei *Amphicteis Sunderalli* (*loc. cit.*, Taf. **25**) scheint die Hautbrücke angegeben zu sein. Es wäre danach nun vielleicht denkbar, dass die zwischen den Kiemengruppen befindliche Hautbrücke unter geeigneten Spannungsverhältnissen des Körpers ausgeebnet werden und damit ein Verhalten eintreten könnte, wie es bei Ampharete vorkommt, so dass dann in dem angezogenen Punkte jedenfalls kein generischer Unterschied mehr bestände.

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[1] Malmgren, Nordiska Hafs-Annulater. Ofv. k. vet. Akad. Förh., Stockholm, 1865, p. 365, Plate **19**, Fig. 46.

[2] Levinsen, Vidensk. Meddel., 1883, 1884, p. 166.

Weit wichtiger ist der zweite Punkt bezüglich der Hakenflösschen, deren verschiedenes erstes Auftreten den Hauptunterschied zwischen Amphicteis Malmgr. und Ampharete ausmacht. Während bei Amphicteis das erste Hakenflösschen am 4ten Haarborstensegment auftritt, soll es bei Ampharete schon am 3ten Haarborstensegment sich finden (vergl. auch Ehlers, Florida-Anneliden, 1887, p. 231). Es zeigte sich nun, dass bei Exemplaren von Ampharete Grubei ? des Göttinger Museums von Helgoland (der Name ist mit ? versehen), welche betreffs der Rückenpartie zwischen den Kiemengruppen sich wie Ampharete verhalten, thatsächlich das erste Hakenflösschen am 4ten Haarborstensegment (5ten Borstensegment) steht; dasselbe ist der Fall bei *Ampharete patagonica* aus dem Göttinger Museum; das dem Paleenbündel zunächst folgende Haarborstenbündel ist bei *Ampharete grubei ?* fein und klein und nur mit starker Lupenvergrösserung erkennbar. Die beiden angeführten Ampharete-Arten würden hiernach in dem letzten Punkt nicht mehr von Amphicteis abweichen und würden sich verhalten etwa wie die westindische *Amphicteis procera* mit Ampharete-artigem Habitus. Einer Einbeziehung der *Ampharete grubei* und *patagonica* wie vielleicht (?) noch anderer sich ebenso Amphicteis-artig verhaltender Ampharete-Arten in die Gattung Amphicteis dürfte dann nichts mehr im Wege stehen, da auf das Fehlen oder Vorhandensein der Cilien an den Mundcirren wie auf die Zahl der vorderen Haarborstensegmente meines Erachtens kaum ein Gattungsunterschied zu begründen ist. Mit einer etwaigen Einziehung der Malmgren'schen Gattung Ampharete würde der alte Grube'sche Gattungsname Amphicteis mit der Art A. acutifrons wieder zur Geltung kommen.

Fundort:

Nr. 206. Depth 170 fms.
Lat. Martinique N.
Long. " W.

No. 220. Depth 116 fms.
Lat. Sta. Lucia N.
Long. " W.

Nr. 147. Depth 250 fms.
Lat. St. Kitts N.
Long. " W.

Melinna sp.

Ein weiter nicht zu verwendendes vorderes Brüchstück mit Nackenhaken gehört zu dieser Gattung.

Fundort:

Nr. 108.	Depth	994 fms.
	Lat.	21° 43′ N.
	Long.	76° 33′ W.

Melinna monocera, sp. nov.

Taf. 6, Fig. 121–125.

Diese Art wird vertreten durch drei hinten nicht vollständig erhaltene Exemplare von weissgelblicher Färbung, von denen das Eine mit 21 erhaltenen hinteren Hakenflösschensegmenten eine Länge von 2,8 cm., ein Zweites mit ca. 50 solcher hinteren Segmente 3,7 cm., das Dritte mit 43 hinteren Segmenten etwa 4,2 cm., lang ist. Bei vollständiger Erhaltung des Körpers dürfte derselbe wohl gegen 70 Segmente im Ganzen enthalten. Um diese Art, welche keine Nackenhaken besitzt, der Gattung Melinna einordnen zu können, ist der Character der letzteren dahin zu erweitern, dass bei derselben Nackenhaken auftreten oder fehlen können.

Der Habitus der vorliegenden Tiere entspricht in seiner langgestreckten Form dem Character, der für Melinna bekannt ist, der Körper erreicht vorn in der Gegend der Kiemen seine grösste Breite und nimmt an dem grösseren Vorderabschnitt der Region der Haarborstensegmente kaum, dann aber ganz allmählich nach hinten zu an Breite ab; die grösste Körperbreite beträgt etwa 0,2 cm. Der vordere haarborstentragende Körperabschnitt der Tiere enthält 16 Segmente mit Haarborstenbündeln, von denen die 12 hinteren ausserdem Hakenflösschen tragen, während die 4 ersten mit eingesenkten Haarborstenbündeln versehen, in die Bildung der sogen. "Scheide" (Malmgren) aufgehen.

Der Kopflappen (Fig. 121) besteht, wenn man die Strecke von seinem Vorderrande bis an den die Kiemen tragenden Querwulst als Kopflappen ansieht, aus zwei Teilen von gleicher Länge, einer rechteckigen "Stirnplatte" und einer hinteren Hälfte; die hintere Hälfte des Kopflappens wird von der Stirnplatte durch eine Querfurche und Falte abgegrenzt. Unter der die Stirnplatte hinten begrenzenden Falte schiebt sich jederseits ein abgerundeter flacher Vorsprung auf die Stirnplatte etwas vor, welcher bei starker Ausdehnung dieser Partie nur als geringe Erhebung erscheint und von der Grenzfalte nicht bedeckt wird. Der gesammte Kopflappen ist fast doppelt so lang wie breit, rechteckig begrenzt und fällt an seiner Dorsalseite mässig gewölbt und mässig nach vorn ab. Auf der hinteren Kopflappenhälfte wird das vordere Drittel durch eine scharfe Querfurche abgegrenzt, so dass auch wohl die Deutung zulässig ist, die hinteren $\frac{2}{3}$ dieses Kopflappenabschnitts als die dorsale Partie eines borstenlosen Buccalsegments zu betrachten, welches ventral als Unterlippe zu Tage tritt.

Diese Unterlippe (Fig. 122) hat eine quadratische oder rechteckige Form und reicht nur halb so weit wie die Stirnplatte nach vorn; an dem Hinterende der Unterlippe schliesst sich an diese, durch eine Querfurche getrennt und von dem ventralen Vorderrande der Scheide bedeckt, noch eine quere rechteckige Partie an, welche noch mit zum Buccalsegment gehören mag.

Die Stirnplatte überragend erscheint die Fühlermembran als eine vorn mehr oder minder abgerundete an der Unterseite längs eingefaltete Membran. Die Fühler weichen in ihrem Verhalten von den gewöhnlichen Verhältnissen bei Melinna ab; es finden sich in einer unteren Querreihe 6 kurze Fühler, welche kürzer als der Kopflappen sind, in einer oberen Reihe ein einziger Fühler von ungewöhnlicher Länge. Der obere lange Fühler, wie die übrigen mit ventraler Längsfurche versehen, ist bei einem Exemplar, wo er vollständig erhalten und offenbar stark ausgedehnt ist, so lang etwa wie die 26 vordersten Segmente (Fig. 121).

Hinter dem Buccalsegment erheben sich dorsal die beiden aus je 4 Kiemen bestehenden Kiemengruppen auf einem queren Hautsaum, dem Vorderrande des ersten Haarborstensegments. Die Kiemen gehören dem ersten und zweiten Haarborstensegment an und verhalten sich in ihrer Stellung wie sonst bei Melinna, indem beide Kiemengruppen mit der medianen Kieme des vorderen Paares aneinander stossen. Die Kiemen reichen mindestens so weit nach vorn wie die kurzen unteren Tentakel und sind je nach ihrem Contractionszustande quergeringelt mit dünnerer etwas abgesetzter Spitze oder glatt und gleichmässig länger ausgestreckt, an sich von kegelfadenförmiger Gestalt. Der die Kiemen tragende dorsale Teil des Hautsaumes des ersten Borstensegments ist etwa in halber Segmenthöhe durch einen Einschnitt gegen den ventralen Teil dieses Saumes abgesetzt; der ventrale Saum springt weiter nach vorn vor als der dorsale und kann bis an die Basis der Stirnplatte reichen, durch den concaven Verlauf seines fein gekerbten Vorderrandes treten die Seitenpartien dieses Ventralsaumes eckig weiter nach vorn vor als seine mittleren Partie.

Das 1ste bis 4te Borstensegment erhebt sich seitlich-dorsal in einen niedrigen dicken Längswulst, in welchen die 4 ersten Haarborstenbündel eingesenkt sind und welcher am 3ten Segment seine grösste Höhe erreicht, bis dahin zunehmend. Die "Crista," nur bei einem Exemplar gut erkennbar, erhebt sich in der Höhe des 4ten Haarborstenbündels als ein niedriger, glatter Saum ohne Zähne, welcher etwa das mittlere Drittel der Segmentbreite einnimmt. Die sonst bei der Gattung Melinna vorhandenen starken Nackenhaken sind bei keinem Exemplar zu erkennen und fehlen offenbar vollständig.

Der Körper ist auf der Dorsalseite gewölbt, ventral abgeplattet; die Segmentgrenzen sind dorsal innerhalb der Bereichs der Haarborstensegmente, ventral am 1sten bis 4ten Haarborstensegment nicht sehr deutlich, an den folgenden Haarborstensegmenten scharf ausgeprägt, an den hinteren Hakenflösschen tragenden Segmenten ventral wieder undeutlich, doch dorsal schwach angedeutet. Die Ventralseite der Haarborstensegmente ist durch einen queren weisslichen Drüsengürtel ausgezeichnet, welcher in dieser Region nach hinten zu an Länge abnimmt, mit dem ersten reinen Flösschensegment beginnt ventral eine breite mediane Bauchfurche. An den mit Haarborsten und Flösschen ausgestatteten Segmenten ist die ventrale Partie jedes Segments durch eine bogige Längsfurche gegen die Parapodien abgegrenzt. Die Körperhöhe ist wohl am grössten am dritten Borstensegment und bleibt sich annähernd gleich im Bereich der Haarborstensegmente, nimmt dann mit der Breite des Körpers entsprechend ab. Die Breite der Körpersegmente beträgt an den vorderen Haarborstensegmenten mit Flösschen etwa das 2½fache, an den hinteren dieser Segmente etwa das 1½fache der Länge; die reinen Hakenflösschensegmente sind grösstenteils annähernd so breit wie lang, gegen das hintere Körperende steigt an ihnen die Breite wieder auf das 2- bis 3fache der Segmentlänge, von den allerletzten dieser Segmente endlich gehen etwa 9 bezüglich ihrer Länge auf eine Segmentbreite; die 4 ersten Haarborstensegmente sind kurz und zusammen noch nicht halb so lang wie sie breit sind.

Die Borstenbündel bestehen am 1sten bis 4ten Borstensegment aus Haarborsten, welche nur mit den Spitzen oben aus dem Saum der Segmente hervorragen, in welchen ihr Basalteil eingesenkt ist; diese Borstenbündel erscheinen als senkrechte durch die Haut durchschimmernde dunkle Striche, von denen der des 3ten Segments am höchsten an der Körperseite steht. Am 4ten Segment gesellt sich zu dem strichförmigen Borstenbündel noch ein über diesem stehendes feines Haarborstenbündel, welches auf einem niedrigen Parapodialhöcker sitzt. Vom

5ten Segment an treten mit zunehmender Deutlichkeit dorsale kegelförmige Parapodialhöcker auf, an deren Basis unten die hakentragenden Flösschen entspringen.

Vom 17ten Segment an kommen allein noch Hakenflösschen an den Segmenten vor, an deren oberem Basalrande ein kleiner vielleicht als rudimentäres Parapodium oder Cirrus zu deutender Höcker erkennbar ist.

Die Borsten der 4 ersten Borstensegmente sind fein haarförmig und ihr kurzer aus der Haut hervorragender Endabschnitt ist beim Austritt aus der Haut etwas stumpfwinklig gegen ihren basalen Teil gekniet (Vergl. diese Borstenform bei der nächstfolgenden Art). Die Haarborsten des 5ten bis 16ten Borstensegments stehen in einem schmalen, seitlich comprimierten Fächer auf ihren Parapodien und sind in zwei Reihen vorhanden, deren Borsten etwas verschieden sind. Die längeren von diesen Borsten (Fig. 123) sind mit breitem, schräg gestricheltem Saum versehen und endigen in eine lange, mässig gebogene Spitze, welche an ihrem concaven Rande mit Einschnürungen versehen ist. Die kürzere Borstenform (Fig. 124) ist ebenso breit gesäumt, aber so gut wie nicht gebogen und mit kürzerer Endspitze versehen. Die Haken stehen in einer Querreihe etwas vor und parallel dem distalen Rande der Hakenflösschen, sind in der Mitte am breitesten (Fig. 125) und tragen an ihrer Schneide 4 starke Kammzähne in einfacher Reihe. Die Zahl der Haken am den Segmenten der Haarborstenzone ist beträchtlich grösser als an den reinen Flösschensegmenten, an einem Segment der ersteren fanden sich etwa 55 Haken an einem der grössten vorderen Flösschen; die Haken des hinteren Körperabschnitts, im Allgemeinen denen der Haarborstenzone ähnlich, tragen an ihrer Schneide eine Reihe von 5 Zähnen, von denen die zwei obersten, kleinsten Zähne bei einer Ansicht auf die Schneide als Glieder je einer mehrgliedrigen Querreihe hervortreten.

Die Form der Hakenflösschen verändert sich in der Weise von vorn nach hinten zu, dass die vordersten Hakenflösschen die höchsten und wohl 3mal höher als breit sind, während unter Zunahme der Länge und Abnahme der Breite die hinteren Flösschen länger als hoch, etwa doppelt so lang wie hoch sind.

Fundort:

Nr. 206. Depth 170 fms.
Lat. Martinique N.
Long. " W.

Nr. 220. Depth 116 fms.
Lat. Sta. Lucia N.
Long. " W.

Melinna profunda, sp. nov.

Taf. **6**, Fig. 126–127; Taf. **7**, Fig. 128.

Ein nicht gut erhaltenes und hinten verstümmeltes Exemplar mag hier mit einigen Worten erwähnt sein. Das aus bedeutender Tiefe (über 1500 fms.) stammende Tier hat bei einer Länge von ungefähr 2,3 cm. und einer Breite von 0,25 cm. am 3ten Borstensegment noch 22 hintere reine Flösschensegmente. Der Körper des Wurmes enthält in seinem vorderen Körperabschnitt 17 haarborstentragende Segmente, von denen die 4 ersten ohne Flösschen sich an der Bildung der "Scheide" beteiligen. Die Bildung des Kopflappens, der Kiemen u. s. w. zeigt nichts Abweichendes von dem gewöhnlichen Verhalten bei der Gattung Melinna. Was die Zahl der Tentakel anbetrifft, so finden sich in der unteren Reihe 6 schwächere Tentakel, in der oberen nach den Abbruchstellen zu urteilen, wahrscheinlich 4 stärkere, also eine Zahl, wie sie *Melinna parumdentata* aus dem gleichen Gebiet hat.[1] Die Unterlippe reicht bei diesem Tier soweit nach vorn wie die Stirnplatte. Die "Crista" ist leider nicht gut erhalten, daher ist über ihre Form nichts auszusagen.

Die Nackenhaken fehlen bei diesem Exemplar, so dass es doch wohl möglich erscheint, dass in diesem Tier ebenfalls eine Art vorliegt, welche keine Nackenhaken besitzt wie *Melinna monocera*; andererseits ist daran zu denken, dass die immerhin ziemlich fest sitzenden Nackenhaken nur verloren gegangen sind und dass das Exemplar zu *Melinna parumdentata* oder *cristata* gehört. Fig. 126–128 zeigen die Form der Borsten und Haken, die denen der *Melinna cristata* ähnlich sehen.[2]

Fundort:
Nr. 235. Depth 1507 fms.
Lat. Beguia N.
Long. " W.

TEREBELLIDAE.

Terebellides strömi M. Sars.

Die wenigen vorliegenden Exemplare stimmen mit nordeuropäischen Vertretern der Art, wie sie z. B. Malmgren[3] beschrieben hat, überein.

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[1] Ehlers, Florida-Anneliden, 1887, p. 216.

[2] Malmgren, Nordiska Hafs-Annulater. Öfv. k. vet. Akad. Förh., Stockholm, 1865, p. 371, Taf. **20**, Fig. 50.

[3] Ibid., p. 396, Taf. **20**, Fig. 48.

Fundort:

Nr. 128.	Depth 180 fms.	Nr. 265.	Depth 576 fms.
	Lat. Frederickstaed N.		Lat. Grenada N.
	Long. " W.		Long. " W.

Thelepus cincinnatus O. Fabricius.

Es liegen wenige nicht besonders gut erhaltene Exemplare einer Terebellide vor, welche zu dieser Art gestellt wurden. Das grösste hinten verstümmelte Exemplar hat mit 42 Segmenten eine Länge von etwa 3,3 cm. (das Tier ist ventralwärts eingekrümmt) und ist am Grunde des Kopflappens 0,25 cm. breit; das letzte Haarborstenbündel steht am 30ten Segment. Das Exemplar hat jederseits am 2ten Segment 6, am 3ten Segment 5 Kiemen, die kleineren Exemplare haben noch weniger Kiemen. Es ist hier zu bemerken, dass die vorliegenden Tiere recht gut der Beschreibung von Sars[1] von *Thelepodopsis flava* M. Sars entsprechen, nur ist die Zahl der Kiemen bei den europäischen Exemplaren grösser und die Kiemen sind länger. Da nach den Ausführungen von Marenzeller's,[2] *Thelepodopsis flava* mit *Thelepus cincinnatus* zusammenfällt, habe ich die vorliegenden Tiere zu letzterer Art stellen zu können geglaubt, da die westindischen Exemplare mit ihrer geringeren Kiemenzahl wie in der Gestalt der Haken, welche in der Profilansicht am Scheitel zwei Zähne übereinander tragen, übrigens sehr wohl zu der Diagnose von Marenzeller stimmen.

In den Polychaetous-Annelids of Porto Rico (1902, p. 206) wird von Treadwell ein neuer *Thelepus crassibranchiatus* aus Westindien beschrieben, dessen Beschreibung wahrscheinlich ein Exemplar zu Grunde lag, welches mit den von mir untersuchten Tieren identisch ist. Was die Form der dort abgebildeten Haken betrifft (Fig. 71), so ist an denselben der griffartige Fortsatz am unteren Ende, vor welchem der Rand des Hakens eine Einziehung hat, dort nicht angedeutet, während er bei den mir vorliegenden Tieren immerhin ziemlich deutlich erkennbar ist. Will man darauf bestehen, die westindischen mir vorliegenden Tiere, mit denen der *Thelepus crassibranchiatus* wohl identisch ist, auf Grund ihrer in geringerer Zahl vorhandenen Kiemen und deren geringerer Länge[3] von *Thele-*

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[1] Videnskabs Selskabets Forhandlingar, 1871, p. 415.

[2] Zur Kenntniss der Adriatischen-Anneliden. Sitzungsb. Akad. Wissensch., Wien, 1884, Bd. 89, Abth. 1, p. 156.

[3] Die Kurze der Kiemen resultiert vielleicht nur aus einer starken Contraction derselben, ihre geringere Zahl ist möglicherweise auf ein geringeres Alter der Tiere zurückführbar

pus cincinnatus zu unterscheiden, so mögen sie als eine westindische Abänderung des letzteren betrachtet werden.

Fundort:

Nr. 320.	Depth 257 fms. Lat. 32° 33′ 15″ N. Long. 77° 30′ 10″ W.	Nr. 316.	Depth 229 fms. Lat. 32° 7′ N. Long. 78° 37′ 30″ W.

Von einigen Fundorten fanden sich noch wohl der Gattung Terebella im weiteren Sinne angehörende Tiere vor, welche wegen zu schlechter Erhaltung nicht weiter berücksichtigt werden konnten:

Fundort:

Nr. 264.	Depth 416 fms. Lat. Grenada N. Long. " W.	Nr. 215.	Depth 226 fms. Lat. Sta. Lucia N. Long. " W.
Nr. 274.	Depth 209 fms. Lat. Barbados N. Long. " W.	Nr. 131.	Depth 580 fms. Lat. Sta. Cruz N. Long. " W.

SABELLIDAE.

Potamis spathifera Ehlers.

Florida-Anneliden, 1887, p. 278, Taf. 54,

Zwei Exemplare, von denen eines vollkommen erhalten ist, erweisen sich durch die characteristische Form der Kragenmembran als zu dieser Art gehörig. In der Beschreibung dieser Art wird die Kragenmembran als ventral ungeteilt beschrieben; bei den vorliegenden Tieren ist letztere ventral median mit einer flachen, von zwei abgerundeten Lappen flankierten Einkerbung versehen. Beide Exemplare sind beträchtlich grösser als das Originalexemplar des "Blake"; das grössere hinten verstümmelte hat 32 Kiemenstrahlen und mit 25 erhaltenen Segmenten eine Gesammtlänge von ca. 8 cm., das kleinere in ganzer Länge erhaltene mit 26 Kiemenstrahlen und 71 Segmenten hat eine Länge von 7,7 cm. Bezüglich des Biegungsgrades des Endhakens der Hakenborsten finden sich bei den beiden Tieren geringe Abweichungen von einander.

Fundort:

Nr. 307.	Depth 980 fms. Lat. 41° 29′ 45″ N. Long. 65° 47′ 10″ W.	Nr. 238.	Depth 127 fms. Lat. Grenada N. Long. " W.

SERPULIDAE.

Serpula sp.

Ein Exemplar einer deckeltragenden Serpulide liegt vor, dessen nähere Bestimmung wegen des Verlustes des Deckels nicht angängig war. Die rechte Kieme trägt einen kurzen rudimentären Deckelstrahl. Die zugehörige Röhre ist kalkig, aussen bläulichweiss mit sehr schwach manschettenartigen Zuwachsgrenzen, inwendig glatt und orangebraun gefärbt.

Fundort:
Nr. 278. Depth 69 fms.
Lat. Barbados N.
Long. " W.

Vermilia annulata Schmarda (Ehlers).

Von dieser Art fanden sich Röhren und ein paar Tiere, denen der Deckel verloren gegangen war, vor. Nach der Gestalt der Röhren, welche in ihrer Färbung weiss oder gelblich sein können, gehören die Tiere dieser Art an.

Von Nr. 240 liegt ein Exemplar vor, welches mit einigen Bemerkungen erwähnt werden mag und mit der *Vermilia annulata* zugerechnet wurde. Die Collaremembran dieses Tieres, welches nach der Abbruchsstelle zu urteilen den Deckel am linken Kiemenblatt getragen hat, war ventral scheinbar zweilappig, wenigstens gespalten, doch mag diese Spaltung auf eine Verletzung der zarten, leicht zerreissbaren Membran zurückzuführen sein.[1] Die Röhre des Tieres zeigt an ihrem äusseren Umfange starke trichterförmige Erweiterungen und ist ihrem Aussehen nach weniger als kalkartig, denn als gelblich beinartig zu bezeichnen.

Fundort:
Nr. 208. Depth 213 fms.
Lat. Martinique N.
Long. " W.

Nr. 273. Depth 103 fms.
Lat. Barbados N.
Long. " W.

Nr. 240. Depth 164 fms.
Lat. Grenadines N.
Long. " W.

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[1] Ehlers, Florida-Anneliden, 1887, p. 311.

Vermilia annulituba, sp. nov.

Taf. 8, Fig. 153–161.

Diese Art ist nur in einem einzigen, jedoch in ganzer Länge erhaltenen Exemplar vorhanden, welches in seiner Röhre steckte, während eine andere von dem ursprünglichen Besitzer verlassene Röhre einen Sipunculiden (Phascolion) enthielt. Diese Art habe ich zu der Gattung Vermilia gestellt, da sie in den Hauptcharacteren mit der *Vermilia annulata* Schm.[1] übereinstimmt, von dieser aber durch die Form der Röhre und des Deckels zu unterscheiden ist.

Das vorliegende Exemplar hat eine weissgelbliche Färbung, welche am Abdomen stärker gelblich ist, und hat eine Totallänge von 1,85 cm., wovon auf die zusammengelegte Kieme 0,6 cm. und auf das Abdomen 0,8 cm. entfallen, der Thorax ist vorne etwa 0,15 cm. breit. Im zusammengefalteten Zustande ist die Kieme drehrund und etwa so breit wie der Thorax, vorn in der Gegend des Deckels etwas breiter; der Thorax ist ein wenig dorso-ventral abgeplattet wie das Abdomen und etwas breiter als hoch.

Die Kiemenstrahlen sind (Fig. 154) annähernd von gleicher Länge nur der erste dorsale Strahl ist etwas kürzer; im linken Kiemenblatt finden sich 16 Strahlen, im rechten 15 Strahlen und der Deckelstrahl. Im zusammengefalteten Zustande ist jede Kieme in etwas mehr als einer Spiralwindung eingerollt. Die Kiemenstrahlen sind bis auf eine kurze nackte, ganz wenig zusammengedrückt-keulig gestaltete Endspitze mit Kiemenfäden besetzt, welche 2- bis 3mal länger als der Kiemenstrahl hoch ist sind und erst dicht unter der Endspitze an Länge abnehmen. Die Kiemenstrahlen sind an ihrer Aussenseite quergeringelt, ihre Endspitze ist länger als der Strahl hoch ist und die Ursprünge der Kiemenfäden stehen einander bis zur Berührung genähert.

Der Deckelstrahl stellt sich als der zweite Strahl des rechten Kiemenblattes (Fig. 154), vom Rücken aus gerechnet, dar und ist einschliesslich des Deckels so lang wie die Kiemenstrahlen, dorso-ventral abgeplattet und 2mal breiter als die normalen Kiemenstrahlen. Der eigentliche dünne Stiel des Deckelstrahles ist quergeringelt (jeder Ringel etwa 2mal breiter als lang) und nimmt reichlich $\frac{2}{3}$ des ganzen Deckelstrahles ein. Der verdickte Endabschnitt des Deckelstrahles ist gegen den Deckelstiel durch eine stärkere Querfurche abgesetzt und etwa ebenso hoch wie am Ende breit und besteht in seiner Gesamtheit aus einem weichen, breit kegelförmigen Basalteil, welcher am Ende eine niedrige hellbraune, hornige, kreisrunde Scheibe trägt; der Durchmesser der Scheibe ist unten etwas grösser als oben, was daraus resultiert, dass gleichsam eine wenig kleinere runde Scheibe concentrisch auf die grössere untere Scheibe aufgelegt ist. Die Endfläche der Deckelscheibe ist flach trichterförmig, nicht über die Scheibenhöhe nach unten hinaus, vertieft und ist in radiärer Anordnung mit feinen Riefen versehen. An der durchscheinenden Deckelscheibe zeigt sich keine Spur einer Verkalkung resp. eines Kalkbelages. Der Thorax des Wurmes ist von gleichmässiger Breite und besteht aus 7 Segmenten, von denen das erste so breit wie lang ist, die übrigen 2mal breiter als lang sind. Auf der ventralen Fläche des Thorax steht medianwärts von dem unteren Ende der Hakenreihen entlang dem 4ten bis 7ten Segment jederseits eine Reihe von 5 länglich runden weisslichen Flecken, die nach hinten zu kleiner und deutlicher werden. (Drüsenflecke?)

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[1] Ehlers, Florida-Anneliden, 1887, p. 308.

Die Collaremembran des Thorax bedeckt die Basalblätter der Kiemen etwa bis zur halben Höhe, sie ist ungeteilt, vorn grade abgeschnitten und seitlich abgerundet rechtwinklich gestaltet und gegen die Thoracalmembran durch einen tiefen nach hinten und unten ziehenden Einschnitt abgesetzt. Die Thoracalmembran reicht vorn bis an die Wurzel des Deckelstrahles und ihre vorderen Seitenlappen reichen bei völliger Streckung fast über die Körperbreite hinweg; die Thoracalmembran endigt schräg nach hinten und unten ziehend an der hinteren Grenze des 4ten Thoraxsegments und hat im Ganzen grösse Ähnlichkeit mit derjenigen der *Vermilia annulata* (siehe *loc. cit.*). Die Buccalmembran, über die mit Sicherheit ohne Zerstörung des Tieres nichts zu ermitteln ist, scheint ungeteilt zu sein und so weit wie das Collare nach vorn zu reichen.

Das Abdomen ist nur wenig dorso-ventral abgeplattet, etwas stärker abgeplattet erst im hinteren $\frac{1}{6}$ etwa (Fig. 155) im Bereiche der langen Haarborsten und setzt sich aus ungefähr 64 Segmenten zusammen. Die Abdominalsegmente sind an den Seiten deutlich, oben und unten undeutlich, ventral deutlicher als dorsal von einander getrennt und sind in der vorderen Hälfte des Abdomens etwa 8mal breiter als lang, hinten dicht vor der Verschmälerung des Abdomens, die etwa mit dem letzten $\frac{1}{7}$ seiner Länge beginnt, etwa 11mal breiter als lang. Das Abdomen ist bis zu dem verschmälerten Endabschnitt mit schwacher Zunahme annähernd gleich breit und verjüngt sich dann bis zu der etwas gerundeten Endspitze ziemlich schnell.

Die Borsten zeigen sich ähnlich denen der *Vermilia annulata* Schm. wie die Hautsäume resp. Polster, auf denen sie stehen. Das 1ste thoracale Haarborstenbündel ist dünner als die übrigen, enthält wahrscheinlich die gleichen Borstenformen wie die nächstfolgenden Haarborstenbündel (ein grosser Teil derselben war abgebrochen) und ist doppelt so weit vom 2ten Thoracalborstenbündel entfernt als das 2te bis 7te je von einander entfernt sind. Die Haarborsten der Thoraxbündel stehen in zwei Reihen hintereinander in den seitlich zusammengedrückten Bündeln; die Borsten der einen Reihe (Fig. 158), welche in allen Thoraxbündeln vorkommen, sind durchaus dünn haarförmig und schwach gebogen. Die Haarborsten der anderen Reihe sind in den vorderen und hinteren Thoraxbündeln verschieden, in den vorderen Bündeln (Fig. 156) sind es schwach gebogene Borsten, welche unterhalb der haarfeinen Endspitze mit einem einseitigen, breiten, gestrichelten Saum versehen sind; der Übergang der gesäumten Partie dieser Borsten ist gegen den basalen Teil der Borste nicht besonders abgesetzt. Die hinteren Thoraxbündel enthalten an Stelle der einfach gesäumten Borsten Salmacinenborsten (Fig. 157) mit sehr fein gezähnter Endspitze.

Die Haarborsten des Abdomens sind an dem vorderen, bei weitem grössten Teil des Abdomens kurz (Fig. 159) und haben eine etwas verbreiterte Endspitze, welche schwach kniartig gegen den basalen Borstenteil abgesetzt und am convexen Rande mit feinen Randzähnchen besetzt ist. An den 18 bis 20 hintersten Segmenten des Abdomens finden sich beträchtlich lange Haarborsten (Fig. 160), welche mindestens so lang sind wie die halbe Abdomenbreite; diese Borsten sind durchaus haarförmig, in ihrer Aussenhälfte etwas gebogen und hier am convexen Rande sehr fein schräg gestrichelt oder gezähnelt (?). Die Haken (Fig. 161) sind denen der Vermilia annulata ähnlich, tragen am Rande der Schneide etwa 10 bis 12 gleichgrosse Kammzähne und an der Basis der Schneide einen abgerundeten stielartigen Fortsatz, welcher doppelt so lang wie die Kammzähne ist. Die Zahl der Hakenzähne ist an den hinteren Abdominalsegmenten wie auch an den untersten Haken der Hakenreihen etwas geringer als an den vorderen Segmenten und an den oberen Haken der Hakenreihen.

Die Röhre dieser Serpulide (Fig. 153) ist von kalkiger Beschaffenheit, dickwandig, aussen graugelblich, inwendig weiss und glatt und hat die Form eines lang ausgezogenen Kegels. Die ziemlich grade gestreckte Röhre in welcher der bewohnende Wurm steckte, ist 2,7 cm. lang, an der Mündung 0,4 cm. breit und von kreisförmigem Querschnitt. Die Aussenfläche des grösseren, jedenfalls ringsum frei gewesenen oberen Abschnitts der Röhre ist durch regelmässige Querwülste geringelt, welche auf ihrer Aussenkante abgerundet sind und zur Längsachse der

Röhre und zu deren Oberfläche im rechten Winkel abstehen. Nach dem unteren Ende der Röhre zu verschwinden die Querwülste und machen hier, wo die Röhre wahrscheinlich an einem festen Gegenstand befestigt war, mehr oder minder deutlichen, niedrigen, scharfkantigen Längskielen Platz. Durch Ansiedelung fremder Organismen wie Korallen, andrer Wurmröhren kann die Aussenfläche der Röhre ein unregelmässig unebenes Aussehen erhalten.

Fundort:
Nr. 202. Depth 210 fms.
Lat. Martinique N.
Long. " W.

Protula submedia, sp. nov.

Taf. 7, Fig. 145–147; Taf. 8, Fig. 148–152.

Diese Art, welche der *Protula media* Stimpson[1] nahe steht und vielleicht nur als eine Varietät derselben aufzufassen ist, liegt mit ihren Röhren von verschiedenen Fundplätzen vor. Zwei der grössten vollkommen erhaltenen Exemplare haben eine Totallänge von 5 und 4 cm., wovon auf die Kieme und den Thorax 1,8 und 1,1 cm. resp. 1,5 und 1 cm. entfallen. Die Färbung der Tiere ist weissgelblich, am Abdomen seitlich und besonders an dessen Hinterende mehr rostgelblich.

Die zusammengelegte Kieme (Fig. 145) ist in diesem Zustande schwach keulenförmig gestaltet, gegen die Spitze dicker als an der Basis, in ihrem basalen Drittel so breit wie der Thorax. Die Zahl der Kiemenstrahlen beträgt im Ganzen um 100 herum, bei einem Exemplar fanden sich am linken Kiemenstamm 48, am rechten etwa 56 Strahlen, bei einem anderen Exemplar links etwa 54, rechts etwa 57 Kiemenstrahlen. Die zusammengelegte Kieme jeder Seite ist in etwas mehr als einer Spiralwindung eingerollt. Die Kiemenstrahlen sind annähernd gleich lang mit Ausnahme der untersten am meisten ventralwärts gelegenen viel kürzeren Strahlen, und wenig höher als dick bis zur Spitze mit Kiemenfäden besetzt und auf ihrer Aussenkante quergefältelt.

Die Kiemenfäden stehen dicht hinter einander, berühren sich an ihren Basen und sind etwa 1½mal länger als der Kiemenstrahl breit ist. Das jede Kieme stützende Basalblatt hat etwa die Form des oberen Drittels eines Halbkreises, dessen gebogene Kante ganz und dessen grade Kante ventral etwa noch in ⅓ ihrer Länge von den Kiemenstrahlen besetzt ist. Die Kiemenstrahlen sind ungefähr in ihrem basalen ⅙ stärker comprimiert als weiter oben und hier durch eine zarte vom Basalblatte ausgehende Membran an der Aussenseite mit einander verbunden. An der Ursprungsstelle der Kiemenstrahlen erhebt sich an der Innenseite des Kiemenblattes eine freie, kragenartige, gefältelte Haut, welche kaum halb so hoch ist wie die die Kiemenstrahlen am Grunde verbindende Membran.

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[1] Stimpson, Synopsis of the Marine Invertebrata of Grand Manan. Smithsonian Contrib., 1853, vol. 5.

Der aus 7 Segmenten bestehende Thorax ist gleichmässig breit, ungefähr ebenso breit wie hoch, ventral je nach den Umständen mit einer Medianfurche versehen; die thoracalen Segmente sind etwa 1½- bis 2mal so breit wie lang. Die Collaremembran des Thorax ist so lang wie die zwei ersten Thoraxsegmente und ventral ungeteilt, am Vorderrande grade abgeschnitten, an den Seiten rechteckig abgerundet und durch einen tiefen Einschnitt gegen die Thoracalmembran abgesetzt. Die Thoracalmembran reicht ventral so weit nach vorn wie das Collare und reicht mit ihren abgerundeten Vorderenden, wenn ganz gestreckt, bequem über die Breite des Thorax hinweg. Die Thoracalmembran zieht sich in ganzer Länge des Thorax an dessen Seiten hin und endigt an dessen hinterer Grenze mit abgerundetem Ende; unter allmählicher Abnahme ihrer Höhe ist die Thoracalmembran hinten am Thorax noch ungefähr so hoch wie dieser.

Das Abdomen ist in seinem weitaus grössten vorderen Abschnitt von gleicher Breite, so breit wie der Thorax und etwa ebenso breit wie hoch, im hinteren ¼ oder ⅙ (Fig. 146) gegen das gerundet zugespitzte Ende ziemlich schnell verjüngt und dorso-ventral stärker abgeplattet, an der Ventralseite mit einer mehr oder minder deutlichen Medianfurche versehen. Die Abdominalsegmente, einige 80 an der Zahl, sind in der vorderen Hälfte des Abdomens etwa 9- bis 10mal breiter als lang und an den Seiten deutlich durch Furchen getrennt, weniger deutlich an der Bauch- und namentlich an der Rückenseite, das Ende des Abdomens trägt an seiner Rückenseite im Bezirk der langen Haarborsten einen medianen, etwas erhabenen, rostgelblichen Drüsenstreifen.

Die Haarborstenbündel des Thorax stehen mit Ausnahme des etwas schwächeren und etwas mehr dorsalwärts verschobenen Buccalbündels in gleicher Höhe und tragen die in einem seitlich zusammengedrückten Fächer stehenden Borsten in zwei Reihen hintereinander. Die Haarborsten des Buccalbündels gleichen denen der nächstfolgenden Thoraxbündel; die Haarborsten der vorderen Reihe im Borstenfächer sind im Princip gestaltet wie die langen Borsten der hinteren Reihe (Fig. 148), sie sind in der Endhälfte schwach gebogen und mit glattem, breitem, schräg gestricheltem Saum versehen und etwa nur halb so lang wie die langen Borsten des Bündels, auch etwas schwächer gebogen und ein wenig schmäler gesäumt als letztere. Auf der Oberfläche wenigstens der langen Haarborsten ist eine äusserst feine Punktierung erkennbar, wie wenn dieselbe mit ganz feine kurzen Härchen bedeckt wäre. Vom 4ten Thoraxbündel an werden neben den glattgesäumten langen Haarborsten Salmacinenborsten mit feiner einseitiger Zähnelung an der concaven Kante ihrer Spitze oberhalb einer kurzen, breit glattgesäumten unteren Partie gefunden (Fig. 147). Die Haarborsten des Abdomens sind am grössten vorderen Teile desselben kurze Borsten (Fig. 149), welche eine gegen die Basalpartie schwach knieartig abgesetzte und etwas verbreiterte Endspitze haben, welche an ihrer concaven Kante sehr fein gezähnt ist. Die langen Haarborsten der hintersten Partie des Abdomens (Fig. 150), welche ungefähr das hintere $\frac{1}{6}$ desselben einnehmen, sind beträchtlich lang (mindestens so lang wie die halbe Abdominalbreite) und durchaus haarartig gestaltet, am Ende ein wenig gebogen und an der Oberfläche durch einen äusserst feinen Besatz mit kurzen Härchen (?) dicht punktiert. Die Haken (Fig. 151) sind etwas anders gestaltet als bei *Protula media* (so bei nordischen Exemplaren) wie auch bei *Protula americana* McIntosh,[1] indem ihr schmaler Endabschnitt mehr parallelseitig und tischmesserklingenartig geformt ist mit geringen Abänderungen in der Länge bei den einzelnen Haken. Die Schneide der Haken trägt oberhalb eines scharfzugespitzten stielartigen Fortsatzes eine Reihe von ungefähr 20 scharfen Kammzähnen.

Die Wohnröhren der Tiere (Fig. 152) sind mehr oder minder stark unregelmässig gebogen, kalkig, frei oder mit einander verwachsen (eine Röhre war an der Basis an einem Seeigelschalenfragment befestigt), von Farbe aussen weiss bis schmutzig-bräunlich, an der Innenseite weiss und glatt. Die Röhre hat im Allgemeinen nur wenig hervortretende, undeutliche Zuwachsgrenzen (mitunter sind diese etwas kielartig erhaben) und ist auf ihrer Aussenfläche mit zahllosen, winzigen, mehr oder minder konisch gestalteten Protuberanzen besetzt, welche ein etwas bürstenartig rauhes Gefühl verursachen, wenn man mit dem Finger über die Röhrenoberfläche fährt. Durch Besatz mit harten Fremdkörpern kann die Röhrenoberfläche ausserdem unregelmässig gestaltet sein. Einige der längsten bewohnten Röhren (die längste Röhre war mit Berücksichtigung der Krümmung annähernd 15 cm. lang) haben an der Mündung eine Breite von 0,6 oder 0,65 cm.

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[1] Challenger Reports, 1885, vol. 12. Annelida.

Von den Arten des atlantischen Gebiets mit ähnlichen Röhren hat *Protula americana* von der nordamerikanischen Küste eine glatte Röhre; ob die Röhren der *Protula media* die eigentümliche Rauhigkeit derjenigen der vorliegenden Art ebenfalls haben, war an nordischen Exemplaren der ersteren des Göttinger Museums (von der Olga-Expedition, nicht ganz sicher als solche bestätigt) nicht deutlich zu erkennen, da die Röhren der Tiere stark mit einander verwachsen waren.

Fundort:

Nr.	Depth	Lat.	Long.
Nr. 238.	Depth 127 fms.	Lat. Grenadines N.	Long. " W.
Nr. 291.	Depth 200 fms.	Lat. Barbados N.	Long. " W.
Nr. 216.	Depth 154 fms.	Lat. Sta. Lucia N.	Long. " W.
Nr. 154.	Depth 248 fms.	Lat. Sta. Cruz N.	Long. " W.
Nr. 238.	Depth 127 fms.	Lat. Chunnan N.	Long. ? W.
Nr. 248.	Depth 161 fms.	Lat. Grenada N.	Long. " W.
Nr. 258.	Depth 159 fms.	Lat. Grenada N.	Long. " W.

STERNASPIDAE.

Sternaspis fossor Stimpson.

Synopsis of the Marine Invertebrata of Grand Manan. Smithsonian Contrib., 1853, vol. 5, p. 29, Plate 2, Fig. 19.

Es fanden sich zwei Exemplare mit eingezogenen Hakensegmenten von 0,7 und 1,1 cm. Länge eines Sternaspis in der Agassiz'schen Sammlung vor, die ich auf Grund der eingehenden Erörterungen von Marenzeller's über *Sternaspis fossor*[1] zu dieser Art stellen möchte. Eine Fundortsangabe fand sich bei den Tieren nicht vor, es hat daher die Annahme, dass dieselben aus Westindien stammen, nur als wahrscheinlich zu gelten. Es ist über die beiden Tiere auch mit Berücksichtigung des mediterranen *Sternaspis scutata* noch folgendes zu bemerken.

In der Umrissform des Schildes verhalten sich beide Tiere verschieden. Das kleinere Tier zeigt die Form jeder Schildhälfte noch etwas extremer und an den Seiten noch stärker gerundet als die Abbildung von Marenzeller's, eher noch etwas höher als breit und im Vergleich zu ungefähr gleichgrossen Tieren von *Stern. scutata* schwächer sculpturiert; die diagonale, von der Hinterecke der Schildhälfte medianwärts zur Schildnaht verlaufende starke Rippe ist bei diesem Tier so gut wie nicht ausgeprägt. Das grössere Exemplar hat Schildhälften mit deutlicher Diagonalrippe, welche etwas länger als hoch sind; die Hinterecken des Bauchschildes sind schräg nach hinten etwas vorgezogen, so dass die Gesammtform des Schildes vielmehr der Schildform bei einzelnen Mittelmeertieren des *Sternaspis scutata* gleicht. Die meisten mir zum Vergleich zur Verfügung stehenden Mittelmeertiere von *Stern. scutata* halten in der Umrissform ihres Bauchschildes etwa die Mitte zwischen den beiden amerikanischen Tieren. Bei einer Anzahl von Tieren des Mittelmeer-Sternaspis stellte sich das Verhältnis der Höhe zur Breite der Schildhälften so dar, dass meistens Höhe und Breite so gut wie gleich sind, seltener eine von beiden Dimensionen etwas überwiegt.

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[1] Annulaten des Beringsmeeres. Annalen Naturh. Hofmuseum, Wien, 1890, Bd. 5, p. 5, Taf. 1, Fig. 4, 5.

Aus dem Gesagten ergiebt sich, so weit nach nur zwei Exemplaren geurteilt werden kann, bezüglich dieser als *Sternaspis fossor* bezeichneten Tiere eine ziemlich bedeutende Variation betreffs der Form des Bauchschildes und es erscheinen danach die Charactere dieser Art fluctuierend und gegenüber *Sternaspis scutata* nicht scharf abgegrenzt. Doch liesse sich erst aus einem grösseren Material des in Westindien vorkommenden Sternaspis ein Urteil bilden, ob letzterer nur als Varietät der Mittelmeerart anzusehen wäre.

Fundort: ? Wahrscheinlich Westindien.

Der Aufzählung westindischer Polychaeten, die in den vorstehenden Zeilen gegeben wurde, sind noch ein paar Gephyreen anzuschliessen, welche sich in der gleichen Collection vorfanden.

Bonellia minor Marion.

Rietsch, Étude sur les Géphyriens armés. Rev. Zool. Suisse, 1886, vol. 3.

Zwei verstümmelte weibliche Exemplare, denen der Rüssel verloren gegangen ist und von denen das Grössere etwa 1 cm. lang ist, gehören nach der Lage des Segmentalorgans auf der linken Seite wohl dieser Art an. Die für die Erkennung der Art in Frage kommenden Bauchhaken sind am Ende abgebrochen. An den schlauchförmigen Analbäumen entspringen die kurzen trichtertragenden Endzweige an den unteren $\frac{2}{3}$ der Analbäume etwa von primären Seitenzweigen des Hauptschlauches, am Ende der Analbäume vom Hauptschlauch direct. Diese

Art scheint, da sie neuerdings auch von Japan bekannt geworden ist,[1] eine recht weite Verbreitung zu haben.

Fundort:

Nr. 273.	Depth 103 fms.	Nr. 320.	Depth 257 fms.
	Lat. Barbados N.		Lat. 32° 33′ 15″ N.
	Long. " W.		Long. 77° 30′ 10″ W.

Sipunculus robustus Keferstein.

Selenka, Die Sipunculiden. Wiesbaden, 1883, p. 97.

Einen in einem kleineren Exemplar vorliegenden Sipunculus habe ich dieser Art zugerechnet. Das Exemplar hat 22 Längsmuskelstränge, die dorsalen Retractormuskeln entspringen von 8ten und 9ten, die ventralen Retractoren vom 3ten und 4ten Längsmuskel ab Bauchmark; die Segmentalorgane münden zwischen dem 4ten und 5ten Längsmuskel nach aussen. Das an manchen Tieren dieser Art (so an indo-pacifischen) deutliche, in Querlinien abgelagerte dunkle Pigment vermochte ich hier nicht zu erkennen (vergl. Selenka).

Fundort:
Nr. 265. Depth 576 fms.
Lat. Grenada N.
Long. " W.

Phascolion strombi Mont Thiel.

Phascolion strombi Théel, Études sur les Géphyriens inèrmes. Bihang till k. Svenska vet. Akad. Handling, 1875, Bd. 3.

Es fanden sich von mehreren Fundorten Exemplare eines Phascolion vor, welche zum Teil in mit Schlamm verklebten Schneckenschalen steckten, wie es bei dem europäischen *Phascolion strombi* vorkommt, und die als zu dieser Art gehörig betrachtet werden müssen. Die vorliegenden Tiere entsprechen den Angaben, mit denen Verrill[2] amerikanische Phascolion unter dem Namen *Phascolion tubicola* beschrieben hat; die als *Phascolion tubicola* beschriebene Art wird von Verrill später (vergl. die Zusammenstellung über Polychaeten-Litteratur bei Verrill: New England Annelida. Part I. Historical Sketch with annotated Lists of the Species hitherto recorded. Trans. Conn. Acad. vol. 4) als mit *Phascolion strombi* zusammenfallend bezeichnet. Durch Vergleich der vorliegenden Würmer mit europäischen Exemplaren von *Phascolion strombi* kann ich Verrill's spätere Aussicht bestätigen. Die westindischen Phascolion stimmen mit *Phascolion strombi* im inneren Bau überein, wie auch äusserlich in der Form und Färbung der Haftpapillen des Mittelkörpers. Die Haken der westindischen Exemplare sind wohl noch etwas schmäler und so gut wie gar nicht gebogen im Vergleich mit europäischen Tieren der Art.

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[1] Ikeda, The Gephyrea of Japan. Journ. College Sci. Imp. Univ. Tokyo, 1904, vol. 20, p. 72.

[2] Amer. Journ. Sci., 1873, (3) vol. 5, p. 99.

Bei einem Tier mit ausgestülptem Rüssel waren 14 Tentakel etwa zu erkennen; ein contractiles Gefäss am Vorderdarm kommt offenbar auch den westindischen mir vorliegenden Phascolion zu und zwar ist dasselbe, soweit ersichtlich, an seiner Oberfläche glatt, da geringe erkennbare Einkerbungen auf derselben wohl nur der Ausdruck eines stärkeren Contractionszustandes sind.

Fundort:

Nr. 214. Depth 476 fms.
Lat. Martinique N.
Long. " W.

Nr. 230. Depth 464 fms.
Lat. St. Vincent N.
Long. " W.

Nr. 165. Depth 277 fms.
Lat. Guadeloupe N.
Long. " W.

Nr. 261. Depth 340 fms.
Lat. Grenada N.
Long. " W.

Phascolion pallidum Koren & Danielssen meridionale, var. nov.

Taf. 8, Fig. 162–166.

Es liegen zwei Exemplare eines Phascolion vor, beide mit eingezogenem Rüssel und in diesem Zustande ca. 1,1 cm. lang, welche ich als eine Varietät des nordeuropäischen *Phascolion pallidum*[1] anzusehen geneigt bin. Der Rüssel beträgt etwa $\frac{1}{3}$ der Gesammtlänge der Tiere und mag in ganz ausgestrecktem Zustande wohl noch länger sein. Die Färbung der Würmer ist am Hinterende und der Rüsselbasis bräunlichgelb und bei einem Tier am Mittelkörper durchscheinend weissgelblich; das zweite Exemplar ist am Mittelkörper nicht durchscheinend und im Ganzen dunkler gefärbt (wohl infolge Contraction). Bei einem Exemplar waren etwa vierzehn Tentakel zu erkennen. Die Haken (Fig. 162, 163) sind nicht in grosser Zahl vorhanden, sind seitlich stark zusammengedrückt und ziemlich stark in etwas verschiedenem Grade gebogen; eine Anordnung der Haken in deutlichen Querreihen ist nicht vorhanden.

Etwa auf halber Körperlänge oder etwas über diese hinaus nach hinten finden sich abgeplattete nach vorn gerichtete Haftpapillen von verschiedener Grösse, Fig. 166 zeigt eine solche ungewöhnlich grosse Papille; die Haftpapillen sind nicht wie bei *Phascolion strombi*, dem die Würmer im inneren Bau sehr ähnlich sind, durch besondere Färbung ausgezeichnet. Während die Hautpapillen am übrigen Mittelkörper klein und kaum abgeplattet sind und wenig hervortreten, sind die Papillen an der Rüsselbasis und am Hinterende wieder grösser und haben bei dunklerer Färbung eine bauchig eikegelförmige Gestalt mit kurzer kegelförmiger Endspitze (Fig. 164, 165), ragen auch stärker vor als am Mittelkörper.

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[1] Koren & Danielssen, Fauna littoralis Norvegiae. 1877, part 3, p. 132, Taf. 14, Fig. 22–24.

Ein contractiler Schlauch an der Dorsalseite des Vorderdarmes ist offenbar vorhanden und an seiner Oberfläche durch Querfurchen mit schwachen Aussackungen versehen. Am Enddarm findet sich ein Darmdivertikel von ziemlich kugeliger Form.

Im inneren Bau gleichen die Tiere sehr dem *Phascolion strombi* und die beiden Rüsselretractoren verhalten sich ähnlich wie dort und wahrscheinlich ist auch die innere Organisation des *Phascolion pallidum* typic. dem entsprechend beschaffen trotz einiger, vielleicht nur scheinbarer Abweichungen. Während bei den westindischen Exemplaren von den zwei Retractoren der ventrale mit seinen Wurzeln symmetrisch zu beiden Seiten des Bauchmarks über diesem entspringt, ist in Fig. 23 bei Koren & Dan. der Ursprung dieses Retractors als rechts neben dem Bauchmark entspringend gezeichnet, was mit Rücksicht auf das Verhalten anderer Phascolion-Arten kaum in Wirklichkeit so sein dürfte. Der dorsale Retractor ist bei den amerikanischen Tieren wie auch sonst bei Phascolion-Arten mit 2 Retractoren, vor seinem Herantreten an den Vorderdarm nicht gegabelt, wie es bei *Phascolion pallidum* der Fall sein soll; es mag bei dem einzigen Exemplar des letzteren, nach dem die Beschreibung gemacht wurde, ein individuelles Verhalten gewesen sein (?). Was die Befestigung der Darmwindungen anbelangt, so finden sich einige fadenförmige Befestiger an dem vorderen Teil des Darmschlingensystems (etwa Körpermitte bei den westindischen Tieren), darunter ein besonders langer, welcher vom Vorderdarm entspringt, ehe dieser sich mit dem ventralen Retractor verbindet, und mit einer flachen Verbreiterung auf der linken Körperseite an die Leibeswand sich anheftet; hinten ist die Darmspira, die nur aus wenigen Windungen besteht, durch kurze Befestiger an die Leibeswand angeheftet. Man vergleiche hierzu die Fig. 23 von Kor. & Dan., welche mir den Eindruck erweckt hat, als wenn die Darmspira hinten losgerissen und nach vorn umgeschlagen wäre. Die etwas abweichende Form und schwächere Krümmung der Haken bei den westindischen Tieren gegenüber dem europäischen *Phascolion pallidum* betrachte ich als nicht ausreichend zu einer Absonderung der amerikanischen Tiere als besondere Art und betrachte diese als eine südliche Varietät des *Phascolion pallidum* einstweilen unter der Voraussetzung, dass die ausserdem angezogenen Abweichungen bei *Phascolion pallidum* Koren & Danielssen nur scheinbare und durch besondere Umstände zu erklärende sind.

Fundort:

Nr. 182. Depth 103 fms.
Lat. Barbados N.
Long. " W.

TAFELERKLÄRUNG.

Diejenigen Figuren, welche mit Hülfe eines Microscops hergestellt wurden, sind nach einem Hartnack Microscop meist bei ausgezogenem Tubus gezeichnet worden. Objectiv- und Ocularstärke ist jedesmal beigefügt, der eingeschobene Tubus durch T. ei. bezeichnet worden. Die Figuren von Tafel **3**, und Fig. 10, 123, 128, 140, 143 und 148 sind nachträglich etwas verkleinert. Fig. 5, 11, 21, 23, 105, 123 sind nachträglich des Formates wegen am unteren Ende etwas gekürzt worden.

TAFEL 1.

Chlöenea atlántica McIntosh.

Fig. 1. Kieme. Ob. 5, Oc. 2. T. ei.

Laetmatonice nuchipapillata, sp. nov.

Fig. 2. Vorderende des Tieres von oben. 23 ×. p. Papille.
Fig. 3. Ruder. Ob. 2, Oc. 1. T. ei.
Fig. 4. Mittleres Elytron. 14 ×.
Fig. 5. Feine glatte Dorsalborste. Ob. 8, Oc. 2.
Fig. 6. Starke dorsale Pfeilborste. Ob. 4, Oc. 3.
Fig. 7. Ventrale Borste. Ob. 2, Oc. 4. T. ei.

Pontogenia maggiae, sp. nov.

Fig. 8. Vorderende des Tieres von oben. 23 ×.
Fig. 9. Ventraler Ruderast. Ob. 4, Oc. 3.
Fig. 10. Stück des unteren Teils eines Rückenfilzhaares. Ob. 10, Oc. 2.
Fig. 11. Starke dorsale Borste. Ob. 4, Oc. 3.
Fig. 12. Starke ventrale Borste. Ob. 4, Oc. 3.
Fig. 13. Feine Ventralborste der vordersten Ruder. Ob. 8, Oc. 3.
Fig. 14. Erstes Elytron. 23 ×.
Fig. 15. Mittleres Elytron. 23 ×.

Leanira simplex Ehlers.

Fig. 16. Vorderende des Tieres von oben. 23 ×.
Fig. 17. Ventrale einfache Borste. Ob. 8, Oc. 3.

Sthenelais gracilior, sp. nov

Fig. 18. Mittleres Elytron. Ob. 4, Oc. 2. T. ei.

2
11
16
10
12
17

TAFEL 2.

Sthenelais gracilior, sp. nov.

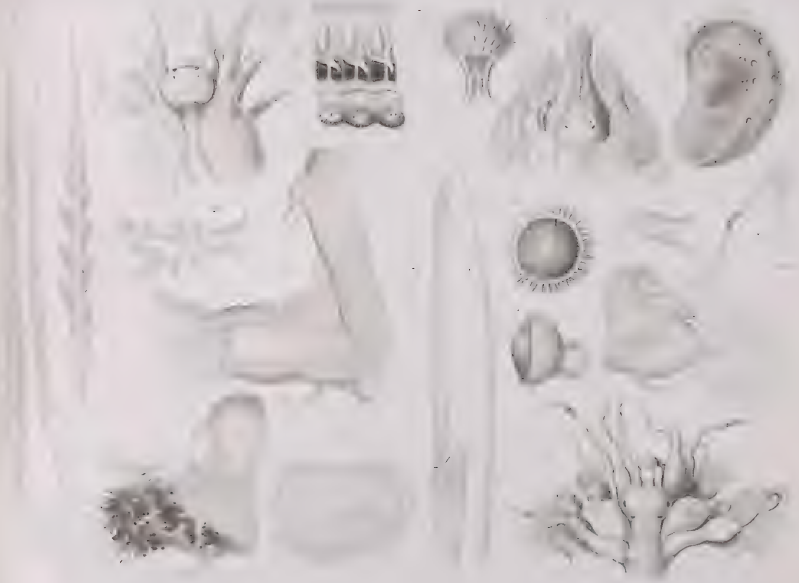
Fig. 19. Vorderende des Tieres von oben. 30 ×.
Fig. 20. Mittleres Ruder. Ob. 4, Oc. 2. T. ei.
Fig. 21. Dorsale einfache Haarborste. Ob. 8, Oc. 3.
Fig. 22. Ventrale geblätterte einfache Borste. Ob. 8, Oc. 3.
Fig. 23. Ventrale zusammengesetzte Borste. Ob. 8, Oc. 3.

Psammolyce floccifera, sp. nov.

Fig. 24. Vorderende des Tieres von oben. 23 ×.
Fig. 25. Mittleres Ruder. Ob. 4, Oc. 2.
Fig. 26. Einige Ruder von aussen seitwärts gesehen mit den häutigen Lamellen und den von den Kiemen herabziehenden Wimperleisten. 23 ×.
Fig. 27. Mittleres Elytron. Ob. 2, Oc. 3.
Fig. 28. Haftpapille vom Rücken des Tieres. Ob. 5, Oc. 3.
Fig. 29. Dorsalborste. Ob. 10, Oc. 2.
Fig. 30. Ventrale zusammengesetzte Borste. Ob. 8, Oc. 3.

Lepidonotus citrifrons, sp. nov.

Fig. 31. Vorderende des Tieres von oben. 14 ×. f. Facialtuberkel.
Fig. 32. Mittleres Ruder. Ob. 2, Oc. 2. T. ei.
Fig. 33. Mittleres Elytron. Ob. 2, Oc. 1. T. ei.
Fig. 34. Grosse Papille der Elytronoberfläche von oben. Ob. 8, Oc. 3. T. ei.
Fig. 35. Desgl. eine solche von der Seite. Ob. 5, Oc. 3. T. ei.
Fig. 36. Kleine Papille der Elytronoberfläche von der Seite. Ob. 8, Oc. 2. T. ei.
Fig. 37. Kegelförmige Papille vom concaven Elytronrande. Ob. 8, Oc. 2. T. ei.
Fig. 38. Kopfige Fadenpapille vom convexen Elytronrande. Ob. 8, Oc. 2. T. ei.



TAFEL 3.

Lepidonotus citrifrons, sp. nov.

FIG. 39. Dorsale Borste. Ob. 5, Oc. 3.
FIG. 40. Ventrale Borste. Ob. 5, Oc. 3.

Halosydna (Polynoë) fuscomarmorata Grube (?).

FIG. 41. Mittleres Ruder. Ob. 4, Oc. 3. T. ei.
FIG. 42. Mittleres Elytron. Ob. 2, Oc. 3.
FIG. 43. Lange Dorsalborste. Ob. 8, Oc. 3.
FIG. 44. Ventrale Borste. Ob. 5, Oc. 3.

Halosydna (Polynoë) clavata (Grube) Kroyer.

FIG. 45. Mittleres Elytron. Ob. 2, Oc. 3.
FIG. 46. Eine der kurzen Dorsalborsten. Ob. 8, Oc. 3.
FIG. 47. Ventrale Borste. Ob. 5, Oc. 3.

Polynoëlla pachylepis, sp. nov.

FIG. 48. Vorderende des Tieres von oben. 14 ×.
FIG. 49. Mittleres Ruder. Ob. 2, Oc. 1. T. ei.
FIG. 50. Mittleres Elytron. 14 ×.
FIG. 51. Ventralborste oberhalb der Acicula. Ob. 4, Oc. 2.
FIG. 52. Desgl. unterhalb der Acicula. Ob. 4, Oc. 2.

Nemidia antillicola, sp. nov.

FIG. 53. Vorderende des Tieres von oben. 14 ×.
FIG. 54. Mittleres Ruder. Ob. 2, Oc. 2.
FIG. 55. Mittleres Elytron. Ob. 4, Oc. 1. T. ei.
FIG. 56. Dorsale Borste. Ob. 4, Oc. 2.
FIG. 57. Ventrale Borste. Ob. 4. Oc. 2.
FIG. 58. Papillen der Elytronoberfläche. Ob. 8, Oc. 2.
FIG. 59. Flache Wärzchen der Rückenhaut des Tieres. Ob. 5, Oc. 3. T. ei.

TAFEL 4.

Eunice binominata Quatrefages.

Fig. 60. Mittleres Ruder mit Kieme. Ob. 4, Oc. 3, T. ei.
Fig. 61. Haarborste eines mittleren Ruders. Ob. 8, Oc. 3.
Fig. 62. Zusammengesetzte Borste ebenda. Ob. 8, Oc. 3.
Fig. 63. Ventrale dreizähnige Acicula ebenda. Ob. 8, Oc. 3.

Eunice antillensis Ehlers.

Fig. 64. Unterkiefer (gewöhnliche Form). Ob. 2, Oc. 2, T. ei.
Fig. 65. Desgl. mit längeren Schneiden v. Nr. 70. Ob. 2, Oc. 2, T. ei.

Eunice collini, sp. nov.

Fig. 66. Vorderende des Tieres von oben. 14 ×.
Fig. 67. Mittleres Ruder mit Kieme. Ob. 4, Oc. 1, T. ei.
Fig. 68. Zusammengesetzte Borste v. d. Körpermitte. Ob. 8, Oc. 3.
Fig. 69. Desgl. vom 2ten Ruder. Ob. 8, Oc. 2.
Fig. 70. Haarborste eines mittleren Ruders. Ob. 8, Oc. 3.
Fig. 71. Ventrale Acicula ebenda. Ob. 8, Oc. 3.
Fig. 72. Oberkiefer von oben. Ob. 2, Oc. 3, T. ei.
Fig. 73. Unterkiefer desgl. Ob. 2, Oc. 3, T. ei.

Onuphis opalina Verrill.

Fig. 74. Zusammengesetzte Borste vom 1sten Ruder. Ob. 8, Oc. 3.
Fig. 75. Ventrale Acicula der mittleren Ruder. Ob. 8, Oc. 3.

Onuphis rubrescens, sp. nov.

Fig. 76. Vorderende des Tieres von oben. 14 × (etwas ventral eingekrümmt).
Fig. 77. Mittleres Ruder mit Kieme. Ob. 4, Oc. 2, T. ei.
Fig. 78. Haarborste der mittleren Ruder. Ob. 8, Oc. 3.
Fig. 79. Kammborste ebenda. Ob. 10, Oc. 3.
Fig. 80. Ventrale Acicula ebenda. Ob. 8, Oc. 3.
Fig. 81. Zusammengesetzte Borste vom 1sten Ruder. Ob. 8, Oc. 3.
Fig. 82. Oberkiefer von oben. Ob. 2, Oc. 3.
Fig. 83. Unterkiefer desgl. Ob. 2, Oc. 3.

Diopatra glutinatrix Ehlers.

Fig. 84. Mit Schlamm bekleidete Röhre, Natürliche Grösse.

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TAFEL 5.

Diopatra glutinatrix Ehlers.

Fig. 85. Mittleres Ruder mit Kieme. Ob. 4, Oc. 2, T. ei.
Fig. 86. Zusammengesetzte Borste vom 1sten Ruder. Ob. 8, Oc. 3, T. ei.

Diopatra pourtalèsi Ehlers.

Fig. 87. Zusammengesetzte Borste vom 1sten Ruder. Ob. 8, Oc. 3, T. ei.

Diopatra spiribranchis, sp. nov.

Fig. 88. Mit Schlamm bekleidete Röhre. Natürliche Grösse.
Fig. 89. Vorderende des Tieres von oben. 14 ×.
Fig. 90. Ruder (7tes) mit stark entwickelter Kieme. Ob. 2, Oc. 2, T. ei.
Fig. 91. Zusammengesetzte Borste vom 2ten Ruder. Ob. 8, Oc. 3.
Fig. 92. Eine dorsale Acicula der mittleren Ruder. Ob. 8. Oc. 3.
Fig. 93. Ventrale Acicula ebenda. Ob. 8, Oc. 3.
Fig. 94. Haarborste eines mittleren Ruders. Ob. 8, Oc. 3.
Fig. 95. Unterkiefer von oben. Ob. 2, Oc. 3.
Fig. 96. Oberkiefer desgl. Ob. 2, Oc. 3.

Nereis rigida Grube.

Fig. 97. Vorderende des Tieres mit ausgestrecktem Rüssel von oben. 23 ×.
Fig. 98. Desgl. von unten. 23 ×.
Fig. 99. Mittleres Ruder. Ob. 4, Oc. 1.
Fig. 100. Ungleichzinkige Sichelborste unten vom Ventralast eines mittleren Ruders. Ob. 8, Oc. 3.
Fig. 101. Gleichzinkige Grätenborste aus dem Dorsalast ebenda. Ob. 8, Oc. 3

Nereis bicruciata, sp. nov.

Fig. 102. Vorderende des Tieres von oben. 23 ×.
Fig. 103. Mittleres Ruder. Ob. 4, Oc. 1.
Fig. 104. Ungleichzinkige Sichelborste aus dem ventralen Ruderast. Ob. 8, Oc. 3.

TAFEL 6.

Nereis bicruciata, sp. nov.

Fig. 105. Gleichzinkige Grätenborste aus dem dorsalen Ruderast. Ob. 8, Oc. 3.

Castalia hesionoides, sp. nov.

Fig. 106. Vorderende des Tieres von oben. 14 ×.
Fig. 107. Desgl. von unten. 14 ×.
Fig. 108. Mittleres Ruder. Ob. 4, Oc. 1, T. ei.
Fig. 109. Zusammengesetzte Borste. Ob. 8, Oc. 3.

Oncoscolex (*Eumenia*) *heterochaetus*, sp. nov.

Fig. 110. Vorderende des Tieres von der Seite. 14 ×.
Fig. 111. Borste vom 2ten Borstensegment. Ob. 5, Oc. 3.
Fig. 112. Borste eines mittleren Segments. Ob. 8, Oc. 3.

Praxilla gracilis (Sars) Malmgren.

Fig. 113. Ventraler Haken vom 3ten Borstensegment. Ob. 5, Oc. 3.

Maldane collariceps, sp. nov.

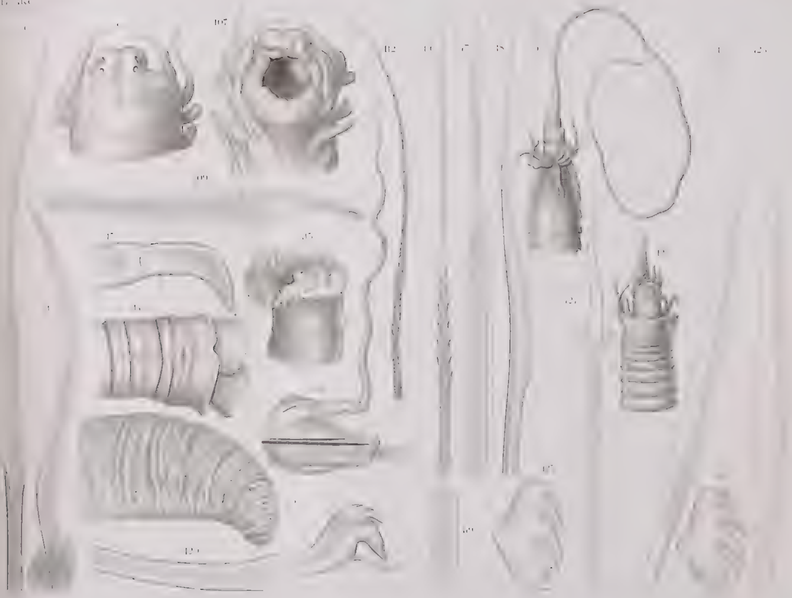
Fig. 114. Hinterende eines anderen Tieres von der Seite und von oben. 14 ×.
Fig. 115. Vorderende des Tieres von der Seite. 14 × (etwas schräg).
Fig. 116. See Fig. 119.
Fig. 117. Lange dorsale Haarborste vom 3ten Segment. Ob. 8, Oc. 3.
Fig. 118. Kurze dorsale Haarborste ebenda. Ob. 8, Oc. 3.
Fig. 119. Gefiederte lange Haarborste vom 7ten Segment. Ob. 8, Oc. 3.
Fig. 120. Ventrale Hakenborste ebenda im Profil. Ob. 8, Oc. 3.

Melinna monocera, sp. nov.

Fig. 121. Vorderende des Tieres von oben. 14 ×.
Fig. 122. Desgl. von unten. 23 ×.
Fig. 123. Lange Haarborste mit Einschnürungen. Ob. 8, Oc. 3.
Fig. 124. Kurze Haarborste. Ob. 8, Oc. 3.
Fig. 125. Ventrale Hakenborste im Profil (von einem Haarborstensegment). Ob. 10, Oc. 3.

Melinna profunda, sp. nov.

Fig. 126. Ventraler Haken im Profil (Haarborstensegment). Ob. 8, Oc. 3.
Fig. 127. Haarborste aus einem Kragensegment. Ob. 8, Oc. 3.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TAFEL 7.

Melinna profunda, sp. nov.

Fig. 128. Lange gesäumte Haarborste (mittleres Segment). Ob. 8, Oc. 3.

Sabellaria asteriformis, sp. nov.

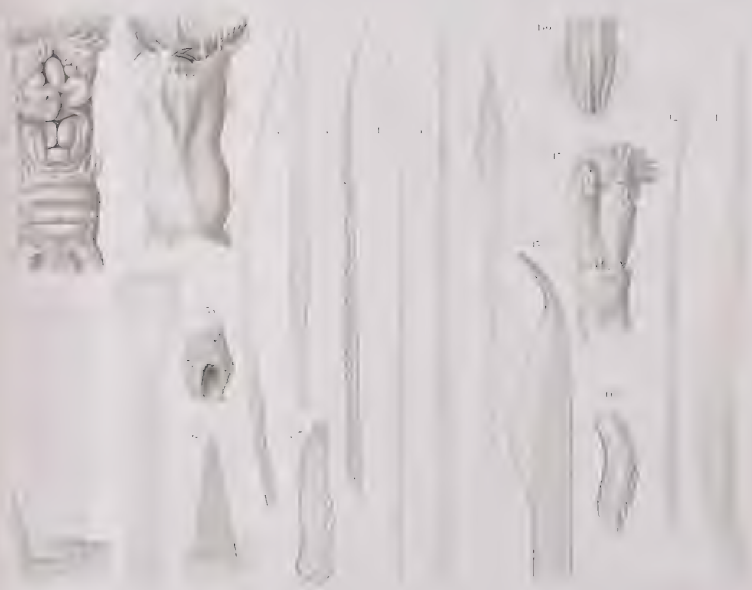
Fig. 129. Vorderende des Tieres von oben. 14 ×.
Fig. 130. Dasselbe von unten. 14 ×.
Fig. 131. Äussere Palee. Ob. 4, Oc. 3.
Fig. 132. Innere Palee. Ob. 4, Oc. 3.
Fig. 133. Dorsale Spatelborste (4tes Segment). Ob. 4, Oc. 3.
Fig. 134. Dorsale Haarborste (ebenda). Ob. 8, Oc. 3.
Fig. 135. Ventrale Haarborste (ebenda). Ob. 8, Oc. 3.
Fig. 136. Ventrale Haarborste (9tes Segment). Ob. 8, Oc. 3.
Fig. 137. Dorsaler Haken (ebenda). Ob. 10, Oc. 3.
Fig. 138. Stück der Röhre. 2 ×.

Sabellaria tenera, sp. nov.

Fig. 139. Innere Palee. Ob. 5, Oc. 3.
Fig. 140. Äussere Palee. Ob. 5, Oc. 3.
Fig. 141. Dorsale Plattborste (2tes–5tes Segment). Ob. 8, Oc. 3.
Fig. 142. Ventrale Haarborste (ebenda). Ob. 8, Oc. 3.
Fig. 143. Ventrale geblätterte Haarborste (Flösschensegment). Ob. 8, Oc. 3.
Fig. 144. Dorsaler Haken (ebenda). Ob. 10, Oc. 3.

Protula submedia, sp. nov.

Fig. 145. Vorderende des Tieres von unten. 4 ×.
Fig. 146. Hinterende des Tieres von oben. 4 ×.
Fig. 147. Salmacinenborste (7tes Thoraxbündel). Ob. 8, Oc. 3.



TAFEL 8.

Protula submedia, sp. nov.

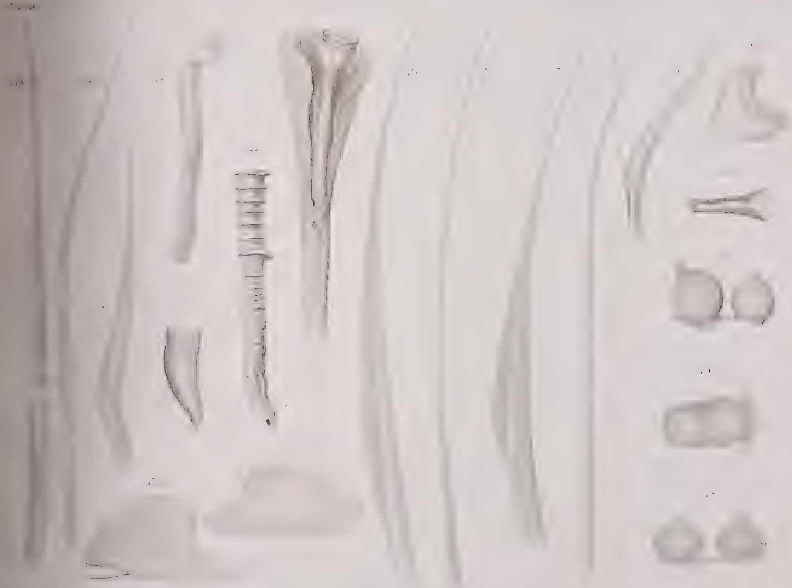
Fig. 148. Lange gesäumte Haarborste (2tes Thoraxbündel). Ob. 8, Oc. 3.
Fig. 149. Kurze gekniete Haarborste (Mitte des Abdomens). Ob. 8, Oc. 3.
Fig. 150. Lange Haarborste (Ende des Abdomens). Ob. 10, Oc. 3.
Fig. 151. Haken vom Abdomen. Ob. 10, Oc. 3.
Fig. 152. Oberes Stück einer Röhre. Natürliche Grösse.

Vermilia annulituba, sp. nov.

Fig. 153. Röhre des Tieres. 3 ×.
Fig. 154. Vorderende des Tieres von oben. 14 ×.
Fig. 155. Hinterende des Tieres von der Seite. 14 ×.
Fig. 156. Gesäumte Haarborste (3tes Thoraxbündel). Ob. 8, Oc. 3.
Fig. 157. Salmacinenborste (7tes Thoraxbündel). Ob. 8, Oc. 3.
Fig. 158. Feine Haarborste aller Thoraxbündel ebenda. Ob. 8, Oc. 3.
Fig. 159. Kurze gekniete Haarborste (Mitte des Abdomens). Ob. 8, Oc. 3.
Fig. 160. Lange Haarborste (Ende des Abdomens). Ob. 10, Oc. 3.
Fig. 161. Haken vom Abdomen. Ob. 10, Oc. 3.

Phascolion pallidum Koren & Danielssen, *meridionale*, var. nov.

Fig. 162. Haken im Profil vom Rüssel. Ob. 8, Oc. 2.
Fig. 163. Desgl. von der concaven Kante. Ob. 8, Oc. 2.
Fig. 164. Papillen von der Rüsselbasis. Ob. 5, Oc. 2.
Fig. 165. Desgl. vom Hinterende des Tieres. Ob. 5, Oc. 2.
Fig. 166. Sehr grosse abgeplattete Papille (Haftpapille) von einem anderen Tier. Ob. 5, Oc. 2.



Bulletin of the Museum of Comparative Zoölogy
AT HARVARD COLLEGE.
VOL. XLIII. — NO. 5.

REPORTS ON THE RESULTS OF DREDGING, UNDER THE SUPERVISION OF ALEXANDER AGASSIZ, IN THE GULF OF MEXICO AND THE CARIBBEAN SEA, AND ON THE EAST COAST OF THE UNITED STATES, 1877 TO 1880, BY THE U. S. COAST SURVEY STEAMER "BLAKE," LIEUT. COMMANDER C. D. SIGSBEE, U. S. N., AND COMMANDER J. R. BARTLETT, U. S. N., COMMANDING.

XLIII.

EINE NEUE MYZOSTOMA-ART.

VON AUGUST REICHENSPERGER.

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CAMBRIDGE, MASS., U. S. A.:
PRINTED FOR THE MUSEUM.
DECEMBER, 1906.

No. 5. — *Reports on the Results of Dredging, under the Supervision of* Alexander Agassiz, *in the Gulf of Mexico and the Caribbean Sea, and on the East Coast of the United States, 1877 to 1880, by the U. S. Coast Survey Steamer "Blake,"* Lieut. Commander C. D. Sigsbee, U. S. N., *and* Commander J. R. Bartlett, U. S. N., *Commanding.*

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XLIII.

Eine neue Myzostoma-Art. Von August Reichensperger.

Bei der genauen Durchsicht des mir vorliegenden Materials von *Pentacrinus decorus* Wyv. Thoms. fand ich zwei Exemplare, die von je einem Myzostoma behaftet waren. Nähere Untersuchung zeigte, dass beide Parasiten der gleichen bisher unbeschriebenen Art angehörten. Ich möchte dieselbe nach ihrem Fundorte *Myzostoma vincentinum* benennen.

Die Farbe der in Alcohol konservierten Tiere ist ein gleichmässiges helles, fast gelbliches Braun. Die Form des Körpers ist annähernd rund, wenig länger als breit. Die Exemplare massen:

I	II
0,93 mm.	0,89 mm. in der Breite.
1,195 "	1,073 " " " Länge.

Die Rückenseite ist stark konvex — wahrscheinlich haben sich die Tiere beim Konservieren zusammengekrümmt, — die Bauchseite ist entsprechend konkav. In der Mitte hat die Rückenseite eine kleine, ovale, ganz glatte Fläche, Fig. **1**; im übrigen ist sie mit zahlreichen, sehr engen, feinen Furchen versehen, die nach dem Rande zu laufen, dort spärlicher und flacher werden und schliesslich ganz verschwinden. So bleibt an den Ansatzstellen der Cirren eine glatte Zone. Es sind zehn Paare von Cirren vorhanden, die fast gleiche Länge haben. Dieselben nehmen ihren Ursprung am Rande der Oberseite und verjüngen sich ziemlich rasch. Ihre Oberfläche zeigt

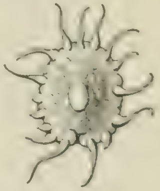

Figure 1.

ein äusserst feines, unregelmässiges Furchensystem. Die Länge der Cirren erreicht fast die Hälfte der Körperlänge des ganzen Tieres; sie beträgt durchschnittlich bei I: 0,535, bei II: 0,493 mm.

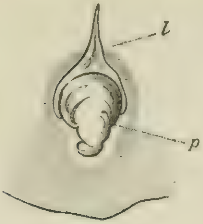

FIGURE 2.

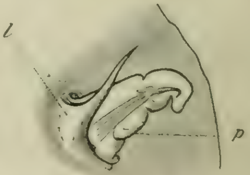

FIGURE 3.

Der Unterseite fehlen die Seitenorgane gänzlich. Es sind zehn Parapodien vorhanden, die sich ziemlich nahe am Rande befinden, etwa ein Fünftel der Breite des Tieres von ihm abstehend. Sie sind stark und kräftig entwickelt. An ihrer Basis befindet sich nach innen zu ein charakteristisches, häutig weiches Gebilde, das sehr an die Ligula eines Grashalms erinnert; Fig. **2** zeigt Gestalt und Lage von oben, Fig. **3** von der Seite. Ähnliche Gebilde finde ich bei keiner andern Art erwähnt. Sie umfassen von innen in Form eines kleinen Wulstes etwa zwei Drittel der Basis des Parapodiums und laufen nach oben hin allmählich in eine ziemlich feine Spitze aus. Nach dem Befund an Schnitten sind es eigenartige Auswüchse der Körperhaut, über deren besondern Zweck ich mir bislang ein sicheres Urteil nicht zu bilden vermochte, da das Material für feine histologische Untersuchungen sich untauglich erwies. Vielleicht dürften sie nervöse Elemente bergen und dann einen ähnlichen Zweck verfolgen wie die Seitenorgane anderer Arten — die Saugnäpfe von Graff's und früherer Autoren — die nach Wheeler und von Stummer-Traunfels Sinnesorgane darstellen. Manubrium und Uncinus liegen im ganzen Verlauf in den Parapodien. Die Spitze des Uncinus ist scharf hakig umgebogen, das Manubrium ist kräftig ausgebildet; beide sind fast ihrer gesamten Länge nach hohl; Fig. **4**.

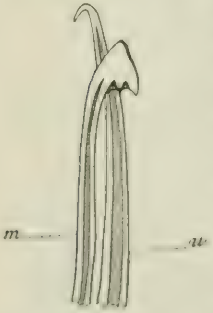

FIGURE 4.

Die Mundöffnung ist ventral fast am Rande gelegen. Die Gestalt des vortretenden Pharynx ist in Fig. **5** wiedergegeben; er besitzt zwei lappige Anhänge, wie solche in grösserer Zahl bei *Myzostoma vastum* Graff vorkommen.[1] Die Kloakenöffnung ist randständig; der Rand ist an der Mündungsstelle schwach ausgebuchtet. Eine vortretende Papille ist hier ebensowenig vorhanden, wie bei den männlichen Geschlechtsöffnungen. Letztere liegen seitlich dicht neben dem dritten Parapodienpaare, zwischen diesem und dem Rand des Tieres und sind schwer auffindbar, da sie leicht von den Parapodien bedeckt werden.

---

[1] Challenger Report; v. Graff Report on the Myzostomidae. London, 1884; Nachtrag, 1887.

Beim Zerlegen der Exemplare fanden sich männliche Geschlechtsproducte und Eier in jedem Reifungsstadium. Die Ovarien sind wenig verästelt; der Uterus mündet von oben in das Rektum. Die Grösse des reifen Eies beträgt 0,036 mm.

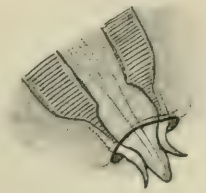
FIGURE 5.

Vom Magen gehen jederseits vier Blindsäcke aus, die im weitern Verlauf anscheinend unverzweigt sind.

Myzostoma vincentinum ist Ektoparasit; ein Exemplar fand sich auf einer regenerierenden Scheibe, das andre sass zwischen zwei Armen fest. Beide liessen sich unschwer ablösen. Systematisch scheint das Tier dem *Myzostoma coronatum* Graff nahe zu stehen.

Vorkommen: Station 269, St. Vincent, U. St. C. S. S. Blake (Alexander Agassiz), 124 Faden tief.

BONN, 1 August 1906.

Bulletin of the Museum of Comparative Zoölogy
AT HARVARD COLLEGE.
Vol. XLIII. No. 6.

REPORTS ON THE DREDGING OPERATIONS OFF THE WEST COAST OF CENTRAL AMERICA TO THE GALAPAGOS, TO THE WEST COAST OF MEXICO, AND IN THE GULF OF CALIFORNIA, IN CHARGE OF ALEXANDER AGASSIZ, CARRIED ON BY THE U. S. FISH COMMISSION STEAMER "ALBATROSS," DURING 1891, LIEUT. COMMANDER Z. L. TANNER, U. S. N., COMMANDING.

XXXVII.

REPORTS ON THE SCIENTIFIC RESULTS OF THE EXPEDITION TO THE EASTERN TROPICAL PACIFIC, IN CHARGE OF ALEXANDER AGASSIZ, BY THE U. S. FISH COMMISSION STEAMER "ALBATROSS," FROM OCTOBER, 1904, TO MARCH, 1905, LIEUT. COMMANDER L. M. GARRETT, U. S. N., COMMANDING.

XIV.

THE MOLLUSCA AND THE BRACHIOPODA.

By William Healey Dall.

With Twenty-two Plates.

[Published by Permission of Marshall McDonald and George M. Bowers, U. S. Fish Commissioners.]

CAMBRIDGE, MASS., U. S. A.:
PRINTED FOR THE MUSEUM.
October, 1908.

No. 6. — *Reports on the Dredging Operations off the West Coast of Central America to the Galapagos, to the West Coast of Mexico, and in the Gulf of California, in charge of* Alexander Agassiz, *carried on by the U. S. Fish Commission Steamer "Albatross" during* 1891, Lieut. Commander Z. L. Tanner, U. S. N., *Commanding*, XXXVIII.

AND

Reports on the Scientific Results of the Expedition to the Eastern Tropical Pacific in charge of Alexander Agassiz, *by the U. S. Fish Commission Steamer "Albatross," from October,* 1904, *to March*, 1905, Lieut. Commander L. M. Garrett, U. S. N., *Commanding*, XIV.

Reports on the Mollusca and Brachiopoda.

By William Healey Dall.

Introduction.

The following report includes in the material treated of, first, the Mollusca and Brachiopoda collected by the U. S. S. "Albatross" during the cruise of February to April, 1891, under the direction of Dr. Agassiz; and, secondly, further material obtained during the voyage of 1904–5, under the same auspices.

At the suggestion of Dr. Agassiz, the molluscan material of the last voyage having proved small in amount though most interesting in quality, the report was extended to cover both voyages, and for completeness' sake I have added a few species obtained in the same region by the "Albatross" during 1888, while on her way from the Atlantic to California, and which had remained without being worked up, having come into my custody after my report on the voyage of 1887–8 had been printed. The few deep-water forms, as well as the shore and reef shells obtained during the Expedition to the Tropical Pacific, August, 1899, to March, 1900, are also included.

As regards the deep-water species this is the first general report upon those obtained in the eastern Pacific, north of the Antarctic region properly so called, and south of California, on the west coast of Middle and South America. The "Challenger" only entered this region for a very brief period, in which but a few hauls of the dredge were made, and the number of species of Mollusca then obtained was very small. A little dredging has been done by the various Antarctic expeditions en route, but in the area above indicated for the abyssal Mollusca the "Albatross" had a practically virgin field.

The littoral mollusk-fauna of the west coast of South America has been explored by D'Orbigny, Cuming, Hupé, C. B. Adams, Plate, Hidalgo, and several other naturalists, with a considerable literature as a result. Smith, Strebel, Mabille and Rochebrune, Couthouy, Gould, King, Philippi, and Melvill have investigated in more or less detail the shallow-water fauna of the Magellanic region, which is now becoming relatively well known; but these orarian species, with an interest all their own, have comparatively little affinity with those of the deeper waters beyond the hundred-fathom line.

I have included in this report a general discussion of all the mollusks collected, with the exception of the nudibranchs, which were placed in the very competent hands of Dr. Rudolph Bergh of Copenhagen, and which were for the most part from comparatively shallow water.

The brachiopods were individually few, but included several interesting new forms.

To the discussion of the species I have prefixed a list of the mollusks and brachiopods of the deep sea actually known to have been obtained from the region indicated. In this list, for completeness' sake, I have included the few species obtained by the "Challenger" and by other expeditions, but which were not collected by the "Albatross."

Species not found at greater depths than 100 fathoms are not included in the list, with the exception of a few obviously benthal forms which seemed to have strayed into shallower water. There was much temptation to include a certain number of deep-sea mollusks which have been dredged in the Pacific or Antarctic seas and which were known or suspected to have a wide distribution in the deep sea, in common with certain others which also do occur off the South American coast. But on reflection it was thought best for the usefulness of the list to restrict it to species actually obtained in the region referred to, taking nothing for granted, except where otherwise indicated. It is true that some abyssal species do have a most extraordinarily extended range, but it is also true that many others, sometimes associated with the former, so far as yet known have a quite restricted range. The reference of any particular species to the one or the other of these groups will therefore necessarily depend upon actual observation.

The material obtained northwest from Panama is less abundant than that from the Gulf of Panama, the vicinity of the Galapagos Islands, and of the southwest coast of the Chilian territory, formerly referred to as western Patagonia. Hence the lists may be regarded as more complete for the west coast of South America than for the deeps further north. There are in the text a considerable number of species discussed which do not appear in the lists, having been collected by the "Albatross" party from moderate depths of water or even on the shores between tides. As a whole, however, this report will add materially to our knowledge of the West American fauna of both deep and shallow water.

The opportunity seems good for making some comparisons between the deep-sea fauna of the West American region we are considering and the fauna disclosed by the researches of the "Blake," "Hassler," and other expeditions on the Atlantic side of the continent, and especially in the Antillean region. The latter was fully reviewed in my report on the "Blake" Mollusca, and the data are therefore ready for making the comparison, which will leave out of consideration the forms belonging to the shallows. If the comparison was made without this discrimination, many of the most striking features of it would be lost. It seems probable that the fauna of the deeps is very ancient, while that of the shallows may date from the late Pleistocene in some cases. Therefore, assuming that the deep-sea fauna is reasonably well known, the contrast between the faunas of the adjacent portions of the two oceans should be suggestive and important in connection with geological theories as to the former relations of seas and shore lines.

The known fauna of the eastern Pacific deep sea, as previously limited, contains about 300 species of Mollusks, if we omit pelagic species which only appear on the bottom, after death, like the Pteropods, Janthina, the Argonauts, etc. These are really inhabitants of the superficial strata of the sea and have no place in this discussion. These 300 species are divided into 134 generic and subgeneric groups, but some groups are very populous, while the larger number are represented by but one or two species. The Antillean region possesses 174 groups and a much larger number of species. There are practically no species common to the two regions, except at the southern extreme of South America, where a few species extend northward on both shores of the continent, but do not reach the Antillean or Panamic regions. A few species like *Bathyarca corpulenta*, or some of the Solemyas, have a very wide range over the floor of the Pacific Ocean. Among brachiopods *Discinisca atlantica* is common to the two oceans, and in the Atlantic to both hemispheres. The presence of the *Terebratulina crossei* in both Japan and Patagonia, to my mind, requires confirmation. I have seen numerous specimens from Japan, but nothing of the kind from the Magellanic region, and this is not an abyssal species, like *Terebratula moseleyi*.

That a certain proportion of the North Pacific fauna of the deep sea originated in the south seems highly probable. The north, however, seems also to have contributed its migrants. When the question of "bipolarity" is raised, and based upon a few supposedly identical species, it is but feebly, if at all, supported. But if generic and subgeneric groups be taken instead of species for comparison, an undeniable "bipolarity" is displayed. But this question is one with which our present faunal area is only distantly connected.

Our fauna, which I shall for brevity in this discussion call the "Pacific" fauna, contains about 300 species, belonging to sixty-seven families. Of these eight families furnish more than half, and three of these family groups contain one-third of the whole fauna.

Turritidae contains	57	species
Ledidae "	35	"
Dentaliidae "	14	"
Pectinidae "	13	"
Nuculidae and Naticidae, each	11	"
Trochidae and Limopsidae, each	9	"

The total number of species in these eight families is 159, leaving 141 species for the other fifty-nine families, or little more than two species apiece.

The Antillean fauna has 174 distinct generic and subgeneric or sectional groups of importance represented. The Pacific fauna has only 144. But of all these groups only eighty-nine of mollusks are common to both faunas and six of brachiopods.

The Pacific has three groups of brachiopods and twenty-seven of mollusks not represented in the Antillean fauna.

The Antillean has three groups of brachiopods and seventy-six of mollusks not represented on the Pacific side.

These statistics would indicate, if confirmed by further researches, that the separation between the abyssal fauna of the Pacific and that of the Antilles is very ancient indeed, for in the shallows many of these groups are represented on both sides of the isthmus of Darien, yet have not succeeded in reaching the deep water. That they can endure life in the abysses and are not kept out by any physiological characteristics which unfit them for life in deep water, is proved by the fact that on one side or the other they do at present flourish there, though not on both sides.

The peculiarities of distribution, when analyzed, prove remarkably interesting and not a little puzzling.

For instance, the following Antillean groups, some of which are very populous in species, are not revealed in the Pacific dredgings from deep water:

Ovulactaeon
Ringicula
Trigonostoma
Benthobia
Conomitra
Mitra
Nassarina
Dalium
Eudolium
Triforis
Cerithiopsis
Seila
Mathilda
Fluxina
Clathrella
Rissoa
Benthonella
Hyalorisia
Olivella
Marginella
Voluta
Aurinia
Turbonilla
Addisonia
Microgaza
Dillwynella
Basilissa
Pleurotomaria
Fissurisepta
Pectinodonta
Lepetella
Hanleyia
Limaea
Spondylus
Dimya
Astarte
Liocardium
Meiocardia
Abra
Euciroa
Thecidium
Megathyris

The above list includes the more conspicuous instances only.

On the other hand the Pacific fauna has the following groups not represented in the Antillean deep sea:

Irenosyrinx
Steiraxis
Calliotectum
Borsonella
Phymorhynchus
Surculina
Narona
Adelomelon
Miomelon
Tractolira

Solenosteira
Truncaria
Tritonoharpa
Capulus
Clanculus
Zeidora
Spinula
Malletia (s. s.)
Neilo
Pallium
Acesta
Archivesica
Pholadidea
Dermatomya
Hemithyris
Terebratella
Magellania
Basiliola ?

Even in the groups common to both regions there are some interesting differences.

Mangilia is numerous in the Atlantic, rather sparse in the Pacific; Fusinus rare in the Pacific, numerous in the Atlantic. Anachis, Murex, Scala, Calliostoma, Dentalium, Cadulus, Propreamusium, Phacoides, and Venericardia are relatively common on the east and sparse on the west of the continent. The total absence of the Triphoridae, Cerithiopsidae, and all the group of Marginellidae from the fauna of the west is astonishing, and incomprehensible with our present knowledge. Why should Vesicomya on the east be moderate or small in size, and on the west large even to gigantic?

Why are there no Pyramidellidae of any sort in deep water on the Pacific side? Why should European or Japanese types of Pecten, Lima, etc., appear on the west coast and be absent from the Antilles? These questions will doubtless be answered in the future, but with our present knowledge we can make no satisfactory reply.

After a general survey and comparison of the two faunas, Atlantic and Pacific, as developed by the "Albatross" and other dredgings, it may be concluded that the deep-sea fauna of the eastern Pacific is composed of several elements. We have first a comparatively limited number of abyssal forms of wide distribution. These are doubtless the descendants of very ancient migrants to the deeps, and their precise number and character can only be definitely known after much more extended exploration of the floor of the deep sea. Still, from our present knowledge, it is practically certain that there is such a group of species, although we cannot as yet state how many of them there are.

Secondly, there is a considerable number of species characteristic of the Antarctic and Magellanic regions. Whether they are descended from the present shoal-water fauna to which they are systematically akin, members of which may have strayed into deeper water from time to time and become acclimated there, or whether the deep-sea fauna and the littoral fauna are both descendants of an Antarctic fauna which flourished at a time when the Antarctic region had a milder climate, it is not practicable yet to determine. It is, however, certain that there is a considerable austral element in the existing faunas, both littoral and benthal.

The contributions of boreal seas to the fauna of the eastern Pacific are less easy to determine and less numerous in species under any hypothesis, since when a species extends from one end of the earth to the other it is difficult to determine from which end it originally started.

Lastly, there is an element, of which the extent is still uncertain, due to migration from the Antillean region and adjacent shores of the continent at a time when the passage between the two seas in the region of Panama or elsewhere was not obstructed. Probably a more or less constant migration from shoal water to deeper is going on now, and has always gone on since littoral faunas existed, when barriers of land or of temperature have not intervened.

There is much in the distribution of the present marine invertebrate fauna of South America, east and west, to support the view so strongly urged by von Ihering and others that a barrier existed between the north and south Atlantic basins during late geologic time, making it difficult for the South European animals to reach the South Atlantic unless by the roundabout way of the Red Sea and Indian Ocean. In fact, without some such barrier it seems impossible to account for some of the facts of the present distribution of marine animals.

But that the influx from the Antillean region of its essentially Mediterranean faunal elements into the Pacific by way of the gaps between North and South America was so small as it appears to be seems to need explanation. It may possibly be accounted for by the hypothesis that the immigrants from the Atlantic found the ground already well occupied by a Pacific fauna; but however we attempt to explain it, the fact remains, that the Antillean forms on the Pacific coast are almost exclusively confined to shoal water, while the Pacific coast types like Strombina and Fasciolina, though found abundantly in the Tertiaries of the Texas coast and the West Indies, have survived the Pleistocene only on the shores of the Pacific.

In conclusion I have to thank the authorities of the U. S. National Museum and Smithsonian Institution, the Director of the U. S. Geological Survey, and the Librarian of Congress, for facilities offered and utilized in the preparation of this report. To Dr. H. A. Pilsbry of the Academy of National Sciences, Philadelphia, I am also indebted for advice and information received. The late Dr. J. C. McConnell prepared many of the earlier drawings which appear on the plates, whose perfection accentuates the sense of loss due to his premature death. Miss Evelyn Mitchell has prepared those subsequently required.

I have also to express my gratitude to Dr. Alexander Agassiz for his consideration during the years which have elapsed since this work was begun, and his constant kindness at all times.

SMITHSONIAN INSTITUTION,
May, 1908.

List of Mollusca from deep water of the eastern Pacific Ocean dredged by the U. S. S. "Albatross" on the coasts of Middle and South America, 1887–1904, or reported by other expeditions.

CEPHALOPODA.

Argonautidae.

Argonauta cornuta Conrad.
Argonauta nouryi Lorois.
Argonauta pacifica Dall.

GASTROPODA.

PTEROPODA.

Cavoliniidae.

Cavolina telemus Linné.
Cavolina uncinata Rang.
Cavolina longirostris Lesueur.

OPISTHOBRANCHIATA.

Acteonidae.

Acteon panamensis Dall.
Acteon (Microglyphis) mazatlanicus Dall.
Acteon (Microglyphis) curtulus Dall.
Acteon (Microglyphis) perconicus Dall.

Scaphandridae.

Scaphander cylindrellus Dall.
Scaphander interruptus Dall.
Cylichnella (Bullinella) inca Dall.
Cylichnella (Cylichnium) pizarro Dall.
Cylichnella (Cylichnium) atahualpa Dall.

Bullariidae.

Bullaria (Leucophysema) morgana Dall.

CTENOBRANCHIATA.

Terebridae.

Terebra (Strioterebrum) panamensis Dall.
Terebra (Subula) lingualis Hinds.

Conidae.

Conus gradatus Mawe.
Conus sieboldi Reeve.

Turritidae.

Turris (Surcula) fusinella Dall.
Turris (Surcula) dolenta Dall.
Turris (Surcula) armilda Dall.
Turris (Surcula) notilla Dall.
Turris (Surcula) resina Dall.
Turris (Surcula) dotella Dall.
Turris (Surcula) callicesta Dall.
Gemmula exulans Dall.
Gemmula esuriens Dall.
Gemmula esuriens pernodata Dall.
Gemmula herilda Dall.
Gemmula benthima Dall.
Gemmula eldorana Dall.
Gemmula vicella Dall.
Gemmula scrilla Dall.
? Leucosyrinx clionella Dall.
? Leucosyrinx pacifica Dall.
Irenosyrinx persimilis Dall.
Irenosyrinx leonis Dall.
Irenosyrinx goodei Dall.
Irenosyrinx crebristriata Dall.
Ancistrosyrinx cedonulli Reeve.
Steiraxis aulaca Dall.
Calliotectum vernicosum Dall.
Borsonia (Borsonella) dalli Arnold.
Borsonia (Borsonella) agassizii Dall.
Borsonia (Borsonella) diegensis Dall.
Borsonia (Borsonella) hooveri Dall.
Borsonia (Borsonella) saccoi Dall.

Borsonia (Borsonella) coronadoi Dall.
Pleurotomella (Gymnobela) agonia Dall.
Pleurotomella (Gymnobela) altina Dall.
Pleurotomella (Gymnobela) egregia Dall.
Pleurotomella (Gymnobela) isogonia Dall.
Pleurotomella (Gymnobela) xylona Dall.
Pleurotomella polystephanus Dall.
Pleurotomella dinora Dall.
Pleurotomella esilda Dall.
Pleurotomella suffusa Dall.
Pleurotomella sp.
Pleurotomella (Phymorhynchus) argeta Dall.
Pleurotomella (Phymorhynchus) cingulata Dall.
Pleurotomella (Phymorhynchus) castanea Dall.
Pleurotomella (Phymorhynchus) clarinda Dall.
Mangilia movilla Dall.
Mangilia enora Dall.
Mangilia genilda Dall.
Mangilia sedillina Dall.
Mangilia encella Dall.
Clathurella orariana Dall.
Clathurella panamella Dall.
Glyphostoma immaculata Dall.
Daphnella (Eubela) imparella Dall.
Daphnella (Surculina) blanda Dall.
Daphnella (Surculina) cortezi Dall.
Clinura monochorda Dall.
Clinura peruviana Dall.

Cancellariidae.

Cancellaria (Narona) exopleura Dall.
Cancellaria (Merica) corbicula Dall.
Cancellaria (Merica) centrota Dall.
Cancellaria (Merica) io Dall.
Cancellaria (Merica ?) microsoma Dall.
Cancellaria (Admete ?) californica Dall.

Volutidae.

Adelomelon benthalis Dall.
Adelomelon (Miomelon) philippiana Dall.
Tractolira sparta Dall.

Ptychatractidae.

Ptychatractus californianus Dall.

Fasciolariidae.

Solenosteira elegans Dall.
Fusinus panamensis Dall.
Fusinus fragilissimus Dall.
Fusinus (Exilia ?) rufocaudatus Dall.

Buccinidae.

Truncaria brunneocincta Dall.
Volutopsius ? amabilis Dall.
Phos cocosensis Dall.
Chrysodomus testudinis Dall.

Alectrionidae.

Alectrion (Hima) catallus Dall.
Alectrion (Hima) miser Dall.
Alectrion (Hima) townsendi Dall.
Alectrion (Tritia) exsarcus Dall.
Alectrion (Tritia ?) goniopleura Dall.

Columbellidae.

Columbella (Anachis) scalaris Watson.
Columbella (Anachis) fusidens Dall.
Columbella (Astyris) sp. indet.

Muricidae.

Murex (Tritonalia) diomedae Dall.
Murex (Alipurpura) centrifuga Hinds.
Trophon liratus Couthouy.
Boreotrophon acanthodes Watson.
Boreotrophon panamensis Dall.
Boreotrophon mazatlanicus Dall.
Boreotrophon disparilis Dall.

Scalidae.

Epitonium (Ferminoscala) ferminianum Dall.
Epitonium (Acrilla) pompholyx Dall.
Epitonium (Sthenorhytis) turbinum Dall.

Eulimidae.

Stilifer (Mucronalia) bathymetrae Dall.

Septidae.

Fusitriton cancellatus Lamarck.
Distorsio decussatus Valenciennes.
Tritonoharpa vexillata Dall.

Ranellidae.

Bursa (Lampadopsis) calcipicta Dall.

Cassididae.

Oocorys rotunda Dall.
Oocorys elevata Dall.
Oocorys (Benthodolium) pacifica Dall.

Trichotropidae.

Cerithioderma pacifica Dall.

Seguenziidae.

Seguenzia occidentalis Dall.
Seguenzia stephanica Dall.

Vermetidae.

Petaloconchus complicatus Dall.

Turritellidae.

Turritella mariana Dall.

Solariidae.

Architectonica radialis Dall.

Choristidae.

Choristes carpenteri Dall.

Capulidae.

Capulus chilensis Dall.

Hipponicidae.

Hipponix delicata Dall.

Naticidae.

Natica (Cochlis) othello Dall.
Natica (Cochlis) scethra Dall.
Polinices uber intemerata Philippi.
Polinices (Euspira) agujanus Dall.
Polinices (Euspira) solutus Gould.
Polinices (Euspira) crawfordianus Dall.
Polinices (Euspira) pardoanus Dall.
Polinices (Euspira) vaginatus Dall.
Polinices (Euspira) constrictus Dall.
Polinices (Euspira) litorinus Dall.
Polinices (Euspira) strebeli Dall.

Bathysciadiidae ?

Bathysciadium pacificum Dall.

Cocculinidae.

Cocculina agassizii Dall.
Cocculina nassa Dall.
Cocculina diomedae Dall.

Turbinidae.

Leptothyra panamensis Dall.

Liotiidae.

Liotia (Arene) californica Dall.
Liotia (Arene) pacis Dall.

Trochidae.

Clanculus (Panocochlea) rubidus Dall.
Gaza rathbuni Dall.
Calliostoma iridium Dall.
Turcicula macdonaldi Dall.
Solariella nuda Dall.
Solariella ceratophora Dall.
Solariella galapagana Dall.
Solariella equatorialis Dall.
? Ganesa panamensis Dall.

Haliotidae.

Haliotis pourtalesii Dall.

Fissurellidae.

Puncturella (Cranopsis) expansa Dall.
Puncturella falklandica A. Adams.
Zeidora flabellum Dall.

ISOPLEURA.

POLYPLACOPHORA.

Lepidopleuridae.

Lepidopleurus halistreptus Dall.
Lepidopleurus luridus Dall.
Lepidopleurus opacus Dall.
Lepidopleurus incongruus Dall.
Lepidopleurus farallonis Dall.

Mopaliidae.

Placiphorella blainvillei Broderip.

SCAPHOPODA.

Dentaliidae.

Dentalium aequatorium Pilsbry and Sharp.
Dentalium megathyris Dall.
Dentalium ceras Watson.
Dentalium peruvianum Dall.
Dentalium agassizii Pilsbry and Sharp.
Dentalium brevicornu Pilsbry and Sharp.
Dentalium dalli Pilsbry and Sharp.
Cadulus striatus Dall.
Cadulus albicomatus Dall.
Cadulus californicus Pilsbry and Sharp.
Cadulus platystoma Pilsbry and Sharp.
Cadulus peruvianus Dall.
Cadulus panamensis Pilsbry and Sharp.
Cadulus (Polyschides) dalli Pilsbry and Sharp.

PELECYPODA.

Solenomyacidae.

Solemya (Acharax) agassizii Dall.
Solemya (Acharax) patagonica Smith.

Solemya (Acharax) johnsoni Dall.
Solemya (Petrasma) panamensis Dall.

Nuculidae.

Nucula tanneri Dall.
Nucula savatieri Mabille and Rochebrune.
Nucula panamina Dall.
Nucula taeniolata Dall.
Nucula iphigenia Dall.
Nucula pigafettae Dall.
Nucula agujana Dall.
Nucula exigua Sowerby.
Nucula chrysocoma Dall.
Nucula declivis Hinds.
Nucula colombiana Dall.

Ledidae.

Leda (Jupiteria) callimene Dall.
Leda (Jupiteria) agapea Dall.
Leda (Jupiteria) pontonia Dall.
Leda (Jupiteria) lobula Dall.
Leda cordyla Dall.
Leda loshka Dall.
Leda rhytida Dall.
Leda peruviana Dall.
Leda (Spinula) calcar Dall.
Leda (Spinula) calcarella Dall.
Yoldia (Katadesmia) vincula Dall.
Yoldia (Orthoyoldia) panamensis Dall.
Yoldia (Yoldiella) chilenica Dall.
Yoldia (Yoldiella) indolens Dall.
Yoldia (Yoldiella ?) infrequens Dall.
Yoldia (Yoldiella ?) mantana Dall.
Yoldia (Yoldiella) granula Dall.
Yoldia (Yoldiella) discella Dall.
Yoldia (Yoldiella) leonilda Dall.
Malletia magellanica Mabille and Rochebrune.
Malletia inequalis Dall.
Malletia peruviana Dall.
Malletia truncata Dall.
Malletia (Minormalletia) arciformis Dall.
Malletia (Minormalletia) benthima Dall.
Malletia (Neilo) goniura Dall.
Tindaria compressa Dall.
Tindaria panamensis Dall.

Tindaria atossa Dall.
Tindaria smirna Dall.
Tindaria mexicana Dall.
Tindaria virens Dall.
Tindaria thea Dall.
Tindaria (Tindariopsis) sulculata Gould.
Phaseolus (Silicula) patagonicus Dall.

Limopsidae.

Limopsis zonalis Dall.
Limopsis compressus Dall.
Limopsis jousseaumei Mabille and Rochebrune.
Limopsis diegensis Dall.
Limopsis mabilleana Dall.
Limopsis panamensis Dall.
Limopsis stimpsoni Dall.
Limopsis juarezi Dall.
Limopsis diazi Dall.

Arcidae.

Arca (Bathyarca) nucleator Dall.
Arca (Bathyarca) pompholyx Dall.
Arca (Cucullaria) endemica Dall.
Glycymeris multicostatus Sowerby.

Pectinidae.

Pecten sericeus Hinds.
Pecten (Pallium) miser Dall.
Pecten (Pseudamusium) liriope Dall.
Pecten (Pseudamusium) neoceanicus Dall.
Pecten (Pseudamusium) polyleptus Dall.
Pecten (Pseudamusium) panamensis Dall.
Pecten (Pseudamusium) subhyalinus Smith.
Pecten (Pseudamusium) randolphi Dall.
Pecten (Pseudamusium) gelatinosus Mabille and Rochebrune.
Pecten (Cyclopecten) rotundus Dall.
Pecten (Cyclopecten) cocosensis Dall.
Pecten (Propeamusium) meridionalis Smith.
Pecten (Propeamusium) malpelonius Dall.

Limidae.

Lima (Acesta) patagonica Dall.
Lima (Acesta) agassizii Dall.
Lima (Acesta) diomedae Dall.
Lima (Limatula) falklandica A. Adams.

Mytilidae.

Crenella megas Dall.

Carditidae.

Venericardia (Cyclocardia) velutina Smith.

Kelliellidae.

Aligena pisum Dall.
Aligena borniana Dall.

Leptonidae.

Rochefortia mabillei Dall.
Rochefortia rochebrunei Dall.

Thyasiridae.

Thyasira fuegiensis Dall.

Lucinidae.

Phacoides (Lucinoma) lamellatus Smith.

Cardiidae.

Protocardia panamensis Dall.

Vesicomyacidae.

Vesicomya lepta Dall.
Vesicomya ovalis Dall.
Vesicomya donacia Dall.
Vesicomya stearnsii Dall.
Vesicomya (Archivesica) gigas Dall.
Vesicomya (Callogonia) annulata Dall.

Tellinidae.

Tellina (Phyllodina) fluctigera Dall.
Tellina (Moerella) chrysogona Dall.
Tellina (Angulus) carpenteri Dall.
Macoma (Psammacoma) hesperus Dall.

Corbulidae.

Corbula (Cuneocorbula) ira Dall.

Saxicavidae.

Saxicava antarctica Philippi.

Pholadidae.

Xylophaga mexicana Dall.
Pholadidea (Penitella) minuscula Dall.

Periplomatidae.

Periploma carpenteri Dall.

Anatinidae.

Bushia panamensis Dall.

Lyonsiidae.

Lyonsia panamensis Dall.

Verticordiidae.

Verticordia perplicata Dall.
Lyonsiella radiata Dall.

Poromyacidae.

Poromya perla Dall.
Poromya (Dermatomya) mactroides Dall.
Poromya (Dermatomya) equatorialis Dall.
Poromya (Dermatomya) chilensis Dall.
Cetoconcha smithii Dall.
Cetoconcha scapha Dall.

Cuspidariidae.

Cuspidaria patagonica Smith.
Cuspidaria panamensis Dall.
Cuspidaria (Cardiomya) pseustes Dall.
Cuspidaria (Cardiomya) planetica Dall.
Cuspidaria (Luzonia) chilensis Dall.
Myonera garretti Dall.

List of Brachiopoda from deep water dredged by the U. S. S. "Albatross" on the coasts of Middle and South America or reported by other expeditions.

BRACHIOPODA.

NEOTREMATA.

Discinidae.

Discinisca (Pelagodiscus) atlantica King.

Craniidae.

Crania patagonica Dall.

TELOTREMATA.

Rhynchonellidae.

Hemithyris craneana Dall.
Hemithyris strebeli Dall.
? Basiliola beecheri Dall.[1]

Terebratulidae.

Terebratulina n. sp.
Liothyrina uva Broderip.
Liothyrina moseleyi Davidson.
Liothyrina clarkeana Dall.
Liothyrina wyvillii Davidson.

Terebratellidae.

Terebratella dorsata Gmelin.
Magellania wyvillii Davidson.
Macandrevia americana Dall.
Macandrevia diamantina Dall.
Macandrevia craniella Dall.

Note. — The truly Antarctic species and the species from shallow water, like *Magellania venosa*, from America, are not included in this list.

[1] Reported from Australia and the Hawaiian Islands, but not yet from the American region.

CEPHALOPODA.

DIBRANCHIATA.

OCTOPODA.

Argonautidae.

ARGONAUTA LINNÉ.

Argonauta Linné, Syst. Nat., 1758, Ed. 10, p. 708 (First species and type *A. argo* L. Mediterranean); Hoyle, Cat. Rec. Ceph., 1886, p. 8.

Argonauta cornuta CONRAD.

Argonauta cornuta Conrad, Journ. Acad. Nat. Sci. Phila., Feb., 1854, 2d ser., **2**, p. 332, no. 9, pl. **34**, fig. 2.

Argonauta expansa Dall, Proc. Cal. Acad. Sci., Dec., 1872, **4**, p. 303; Proc. U. S. Nat. Mus., 1902, **24**, p. 511, pl. **33**, figs. 1, 2, 3.

Fragments of this species were dredged at stations 3354, 3356, 3360, 3376, and 3392, in the Gulf of Panama east of Cocos Island. The original description gives the habitat as unknown; the specimens described by me in 1872 were collected in the Gulf of California by Fisher. So far as known, the range of the species is confined to the region between Cape St. Lucas and Panama Bay.

When I described this species, Conrad's paper above referred to was not accessible to me, and, curiously enough, I have found no reference to his descriptions or plate in any of the works on Argonauta I have been able to consult. His figure is not very characteristic, yet, taken in connection with his description, it seems very probable that the two diagnoses refer to the same species. The specimens I have seen are very uniform, the wide auricles invariably present, and the size about the same in all adults, also the granulate surface.

Argonauta nouryi LOROIS.

Argonauta nouryi Lorois, 1852 (Jan.), Rev. et Mag. Zool., 2me sér., **4**, p. 9, pl. **1**, fig. 5; Conrad, Journ. Acad. Nat. Sci. Phila., Feb., 1854, 2d ser., **2**, p. 333.

Argonauta gruneri Dunker, Zeitschr. Mal., Mar. 26, 1852, p. 43; Nov. Conch., Moll., Mar., 1858; p. 29, pl. **9**, figs. 1, 2; Reeve, Conch. Icon., 1861, pl. **3**, fig. 20.

Argonauta argo, forma mutica Martens, Ann. Mag. N. H., 1867, 3d ser., **20**, p. 104.

? *Argonauta gruneri* Sowerby, Thes. Conch., 1864, **3**, p. 264, pl. **258**, fig. 9 (very bad figure).

Marquesas Ids., Lorois, Dunker; equatorial Pacific, Conrad; stations 3394 and 3431, U. S. S. "Albatross," in the Gulf of Panama, and in N. Lat. 24°, in the Gulf of California; off the coast of Peru, Scammon. Also off Acapulco, Mexico, at station 3422, U. S. S. "Albatross."

This beautiful and very distinct little species is widely distributed. It is probable that the reference by von Martens of this species to a form of *argo* is due rather to the very poor figures of Reeve and Sowerby than to actual inspection of specimens, as with the latter under one's eyes any specific connection with the *argo* type is seen at once to be inadmissible. Dunker has given an admirable figure in his Novitates.

The material obtained, as above, by the "Albatross," in all cases was fragmentary, though enough to identify the species, which is represented in the National Museum by other well-preserved specimens.

Argonauta pacifica Dall.

Argonauta pacifica Dall, Amer. Nat., 1869, **3**, p. 237; Amer. Jour. Conch., 1871, **7**, p. 95; Hoyle, Cat. Rec. Ceph., 1886, p. (213) 9.

? *Argonauta argo* Reeve, Conch. Icon. *Argonauta*, 1861, pl. **3**, fig. 2 d.

Monterey, California, southward to the Gulf of California. U. S. S. "Albatross," stations 3365, 3374, 3389, and 3400, in the Gulf of Panama and near the Galapagos Islands; fragments.

It was with some hesitation that I separated this form from the Mediterranean *A. argo* (L.) Blainville, and the reasons which led to the decision are mentioned in the American Journal of Conchology. I have seen much more dry material since that time, all of which is fairly uniform. The specimens are invariably rounder, wider, and shorter than those from the Mediterranean, and the auricles tend more outward. The figures of Reeve and Sowerby representing *compressa* Blainville and *argo* all show a greater space in the lateral sinuses than I have seen in any actual specimen of either. It is probable that further study of the animal will be required to decide the standing of the nominal species of the *argo* group. It seems almost certain that specimens from the Mediterranean, Antilles, and the west coast of America never attain the size of the oriental *compressa*. But it is also practically certain that in this and the *hians* groups the presence or absence of auriculation is not a specific character. Some species appear to be always auriculate, others always without these projections, while others again have an auriculate and a simple form with intermediate gradations occasionally.

As there seems to be no recent summary of the species of Argonauts I have prepared one.

SUMMARY OF RECENT ARGONAUTS.

Group of A. argo.

Aperture simple.

A. **Argonauta grandiformis** Perry.

B. Argonauta argo (L.) Bolten.

1. *A. argo papyria* (Conrad).

Aperture angulate.

2. *A. argo cygnus* (Monterosato).

Aperture auriculate.

3. *A. argo* s. s. (Linné) Bolten.
4. *A. argo americana* (Dall).
5. *A. argo pacifica* (Dall).

C. Argonauta bulleri Kirk.

GROUP OF A. CORNUTA.

Aperture simple.

D. Argonauta nouryi Lorois.

E. Argonauta cornuta Conrad.

1. *A. cornuta dispar* (Conrad).

Aperture auriculate.

2. *A. cornuta* s. s. Conrad.

GROUP OF A. NODOSA.

F. Argonauta nodosa Solander.

1. *A. nodosa bibula* (Bolten).

Aperture simple.

2. *A. nodosa* s. s. Solander.

GROUP OF A. HIANS.

G. Argonauta hians Solander.

1. *A. hians navicula* (Solander).

Aperture auriculate.

2. *A. hians s. s.* Solander.

Aperture simple.

H. Argonauta boettgeri Maltzan.

I. INCERTAE SEDIS.

1. *A. fragilis* Parkinson.
2. *A. geniculata* Gould.
3. *A. rufa* Owen.
4. *A. conradi* Parkinson.

This indicates the existence of eight well-defined species of Argonauta, four of which are known to have both auriculate and simple forms or varieties.

The data are yet insufficient to formulate the range of distribution of any of the species, but they show that several of the species are apparently limited in their range, two species being known from the Gulf of Panama which are unknown from the Caribbean Sea or the Atlantic Ocean.

NOTES ON THE SUMMARY.

The granulation of the surface is not a specific character in Argonauta; all the species show granulation occasionally, though with some it is more conspicuous and constant than with others.

By carefully tracing back the early names, which were nearly all based on still earlier figures, I have been able to determine to which phase, auriculate or simple, each name applies, which necessitates some changes from the usage current in most Argonaut literature. For the convenience of the student I have noted, under the letter and number of each name in the summary, the chief synonyms in the following paragraphs. It should be noted that young specimens of nearly all the larger forms are for a time distinctly auriculate, but may become simple in the adult stage. The brown species, like *A. hians*, are sometimes profusely polka-dotted with small round white spots resident in the shell itself and not in the periostracum.

A. *A. grandiformis* Perry, Conch., 1811, pl. **42**, fig. 4. Cape of Good Hope. This is *A. compressa* Blainville, Dict. Sci. Nat., 1826, **43**, p. 212, and *A. maxima* of some authors, both based on the *Cymbium maximum striatum*, etc., of Gualtieri, 1742, pl. **11**, fig. A. So far as I have observed, none of the very large specimens is auriculate.

B. 1. *A. papyria* Conrad, Journ. Acad. Nat. Sci. Phila., 1854, n. s., **2**, p. 331, pl. **34**, fig. 1; and *A. argo agglutinans* Martens, Ann. Mag. N. Hist., 1867, 3d ser., **20**, p. 106. The locality is not known, but I suspect the closing up of the lateral sinuses is really an abnormality.

B. 2. *A. cygnus* Monterosato, Journ. de Conchyl., 1889, **37**, p. 120. Mediterranean and Caribbean seas. This is the *forma obtusangula* of von Martens.

B. 3. *A. argo* (Linné, 1758, *ex parte*) Bolten, Mus. Bolt., 1798, p. 70, no. 905; + *A. sulcata* Lamarck, Syst. An. s. Vert., 1801, p. 99; + *A. papyracea* Link, Beschr. Rostock Samml., 1807, p. 85; + *A. argo* Lamarck, An. s. Vert., 1822, **7**, p. 652; Blainville, Dict. Sci. Nat., 1826, **43**, p. 212 (after *Cymbium tenue* Gualtieri, 1742); + *A. haustrum* Dillwyn, Rec. Shells, 1817, **1**, p. 335 (testa junior); + *A. naviformis* Conrad, Journ. Acad. Nat. Sci. Phila., 1854, 2d ser. **2**, p. 334. Mediterranean.

The Mediterranean form was early selected from amongst the heterogeneous assembly contained in the *Argonauta argo* of Linné and the older authors. Martini's figure 157, referred to by Bolten, shows only moderate auriculation, which is the rule in Mediterranean specimens, the angles being more vertically extended than in most of the other species.

B. 4. *A. argo* var. *americana* Dall, Bull. 37, U. S. Nat. Mus., 1889, p. 174, pl. **67**, figs. 1–3. East coast of the United States south of Cape Cod, and the West Indies.

This form is small, broad-backed, and strongly auriculate.

B. 5. *A. pacifica* Dall, Amer. Nat., 1869, **3**, p. 237; Amer. Journ. Conch., Nov., 1871, **7**, p. 95.

This is more compressed than the *americana* and with pronounced auricles. Its range extends from Monterey, California, south to the Galapagos Islands.

C. *A. bulleri* Kirk, Trans. N. Zealand Inst., May, 1886, n. s., **1** (18), p. 138, pl. **4**. New Zealand.

This form has a wide auriculate aperture, and its sides slope rapidly to a narrow, deeply channelled keel with particularly sharp compressed tubercles. This results in a wedge-shaped form, apparently unique in the group.

D. 1. *A. nouryi* Lorois; see page 224 for synonymy and remarks.
E. 1. *A. dispar* Conrad, Journ. Acad. Nat. Sci. Phila., 1854, n. s., **2**, p. 332, pl. **34**, figs. 3, 3a. Locality unknown.

This form, by its simple aperture and partly tuberculate dorsal channel, recalls *A. nouryi*, which is however smaller, less compressed, and differently sculptured. If *A. cornuta* has an inauriculate form, this species might represent it, judging by the figures given by Conrad.

E. 2. *A. cornuta* Conrad; see page 224 for synonymy and remarks.
F. 2. *A. nodosa* Solander, Portland Cat. 1786, p. 96, no. 2120, based on the form without auricles figured by Rumphius, Amboin. Rariteitk., pl. **18**, fig. 1; + *A. oryzata* Meuschen (*ex parte*), Mus. Gev., 1787, p. 252; + *A. tuberculata* Bolten, Mus. Bolt., 1798, p. 71; + *A. rotunda* Perry, Conch., 1811, pl. **42**, fig. 2; + *A. tuberculatus* Shaw, Nat. Misc., 1811, **23**, pl. 995; + *A. gracilis* Kirk, Trans. N. Zeal. Inst., 1885, **17**, p. 58, pl. **13**, upper figs. Brazil; Cape of Good Hope, New Zealand, Indo Pacific.

Meuschen's species *oryzata* was a compound of *Argonauta* and *Carinaria* and his nomenclature not Linnean.

F. 1. *A. bibula* Bolten, Mus. Bolt., 1798, p. 71, after Martini. Conch. Cat., 1769, **1**, pl. **18**, fig. 160 = *Nautilus papyraceus auritus* of Favanne, 1756, pl. **7**, fig. A. 7; + *A. tuberculosa* Lamarck, An. s. Vert., 1822, **7**, p. 652; + *A. tuberculata* Kirk, Trans. N. Zeal. Inst., 1885, **17**, p. 58, pl. **13**, lower figures; + *A. nodosa forma aurita* Martens, Ann. Mag. N. Hist., 1867, 3d ser., **20**, p. 104.

Indo Pacific, Moluccas, New Zealand. This at first sight looks very different from the simple *nodosa,* but there are intermediate phases.

G. 1. *A. navicula* Solander, Portland Cat., 1786, p. 44, no. 1055; after Rumphius, Amboin. Rariteitk., pl. **18**, fig. 4; + *A. nitida* Lamarck, An. s. Vert., 1822, **7**, p. 653 (syn. excl.); + *A. oweni* Adams and Reeve, Zool. Voy. Samarang, Moll., 1850, p. 4, pl. **3**, figs. 1a–1d; + *A. kochiana* Dunker, Zeitschr. Mal., May, 1852, p. 49; Novit. Conch., Moll. Marina, 1858, p. 29, pl. **9**, figs. 7, 8; + *A. polita* Conrad, Journ. Acad. Nat. Sci. Phila., 1854, 2d ser., **2**, p. 333, pl. **34**, fig. 4. Antilles, South Atlantic, Indo Pacific region.

Even this polished species will show traces of granulation between the ribs in some specimens. Lamarck's synonyms include the auriculate form, but in his diagnosis he mentions that his shell is not auriculate.

G. 2. A. *hians* Solander, Portland Cat., 1786, p. 44, no. 1055; after Rumphius, Amboin. Rariteitk., pl. **18**, fig. B; + *A. gondola* et *hians* Dillwyn, Rec. Shells, 1817, **1**, pp. 334, 335; + *A. raricostata* Leach, Phil. Trans., 1817, p. 296, pl. **11**, fide Blainville, Dict. Sci. Nat., 1826, **43**, p. 213; + *A. hians* Adams and Reeve, Zool. Voy. Samarang, Moll., 1850, p. 4, pl. **3**, figs 2a–2c; + *A. crassicosta* Blainville, *op. cit.* (young shell), p. 213. Antilles, South Atlantic, Indo Pacific region.

H. *A. boettgeri* Maltzan, Journ. de Conchyl., 1881, **29**, p. 163, pl. **9**, fig. 7; Smith Ann. Mag. N. Hist., 1887, 4th ser., **20**, p. 409, pl. **17**, figs. 1–6. Indo Pacific region, China Seas, Chagos Islands, Mauritius, Australia.

A small, closely rolled, inauriculate brown species, quite distinct in character.

I. I. *A. fragilis* Parkinson, Proc. Boston Soc. N. Hist., Aug., 1856, **5**, p. 387. Locality unknown.

After a careful examination of the description of this unfigured species, I am inclined to believe it based on an abnormal specimen.

I. 2. *A. geniculata* Gould, Wilkes Exploring Expedition, Moll. and shells, 1852, p. 470, pl. **45**, figs. 585 a–c; Otia Conch., 1862, p. 231. Rio Janeiro.

This name is based on the animal of an Argonaut taken without the shell and fully figured in the report.

I. 3. *A. rufa* Owen, name only, Trans. Zool. Soc. Lond., 1836, **2**, p. 114; Gray Cat. Moll. Brit. Mus., Ceph., 1849, p. 34. South Pacific.

The only description of this alleged species is comprised in the five words "animal and shell thick, red," in Gray's catalogue.

I. 4. *A. conradi* Parkinson, op. cit., 1856, p. 386. "New Nantucket," Pacific Ocean.

The description of this small and unfigured shell reads as if it might relate to a variety or mutation of *A. dispar* Conrad.

GASTROPODA.

EUTHYNEURA.

PTEROPODA.

THECOSOMATA.

Cavoliniidae.

CAVOLINA ABILDGAARD.

Monoculus (sp.) Linné, Syst. Nat., 1758, ed. 10, p. 635; 1767, ed. 12, p. 1059.
Anomia sp., Forskäl, Desc. Anim. Orient., 1775, p. 124; Gmelin, Syst. Nat., 1791, p. 3348.
Cavolina Abildgaard, Skrivter Naturh. Selsk., 1791, **1** pt. 2, p. 173, pl. **10**; not of Bruguière, Enc. Meth., 1791, pl. **85**.
Cavlina Poli, Test. utr. Sicil., 1826, **3**, p. 38.
Rheda, Anonymous, Mus. Calonnianum, 1797, p. 41 (*nomen nudum*), *fide* H. and A. Adams, Gen. Rec. Moll., 1853, **1**, p. 51.
Hyalaea Lamarck, Prodrome, 1799, p. 89; Syst. An. s. Vert., 1801, p. 139.
Tricla Oken, Lehrb. d. Zool., 1815, **3**, pp. xi, 327, not of Retzius, 1788.
Orbignyia A. Adams, Ann. Mag. N. Hist., 1859, 3d ser., **3**, p. 45.
Cavolinia Fischer, Man. de Conchyl., 1883, p. 434; Pelseneer, Chall. Rep. Pter., 1887, p. 69; not of Menke, Zeitschr. Mal., 1844, **1**, p. 73.

According to Poli, the naturalist, from whose manuscript and drawings this genus was recognized by Abildgaard, was named Caulini, which is properly rendered into Latin by Poli in the form Cavlina. The rendering Cavolina, though inexact, has precedence and must be adopted, though there is some doubt whether the name of Bruguière or Abildgaard has precedence, both having been published in the same year. Gioeni figured this genus, but did not name it, hence it is inaccurate to refer to him as the author of the name, as too often has been done.

Cavolina telemus LINNÉ.

Monoculus ? telemus Linné, Syst. Nat., 1758, ed. 10, p. 1059. Mediterranean.
Anomia tridentata Forskäl, Descr. Anim. Orient., 1775, p. 124; Gmelin, Syst. Nat., 1791, p. 3348.
Clio volitans Caulini, Descr. An. ined. Crat. Nap., 1826, MS., fide Poli, p. 38.
Cavolina natans Abildgaard, Skrivter Naturh. Selsk., 1791, **1**, part 2, p. 175, pl. **10**.
Hyalaea tridentata Lamarck, Prodrome, 1799, p. 89.
Hyalaea cornea Lamarck, Syst. An. s. Vert., 1801, p. 140; Roissy, Hist. Nat. des Moll., 1806, **5**, p. 73.
Hyalaea tridentata Bosc, Hist. Nat. Coq., 1802, **2**, p. 241; Boas, Spolia atlantica, 1886, p. 115, pl. **1**, figs. 8, 9; pl. **2**, fig 10; pl. **4**, fig. 66; pl. **6**, fig. 100.

Cavolina telemus A. Adams, Ann. Mag. N. Hist., 1859, 3d ser., **3**, p. 44.
Cavolinia tridentata Fischer, Man. de Conchyl., 1883, p. 431; Pelseneer, Chall. Rep. Pter., 1887, p. 83.

Station 3407, U. S. S. "Albatross," in 885 fathoms, near the Galapagos Islands.

This species was obtained by the "Albatross" in 1887 at several stations in the South Atlantic off the coast of South America and is widely distributed in the open sea of both the Atlantic and Pacific oceans. A long list of stations is given by Boas, and Arthur Adams reports it common in the Atlantic and Indian oceans.

The tendency of the early authors who had small collections of pteropods was to name each distinguishable form, and doubtless far too many names were proposed. The reaction from this has swung the pendulum in the other direction perhaps too far, and it is probable that a more thorough knowledge of the living animals would show the truth to lie between these extremes. The uniformity of the living animals taken from a single swarm, and the wide differences of form, color, and proportion which appear in the sketches made from life, can hardly all be attributed to errors of the draughtsman, though the latter must also be allowed for. It is the writer's opinion that future investigation will show that there are some species of Cavolina, at least, which have very similar tests, but differ in form and color of the flippers and other parts of the body.

The full illustration of the stages of growth in the various thecosomatous pteropods is yet a desideratum.

The unequal contraction of muscular and cellular tissue in alcohol, which is exceptionally great among the pteropods, prevents the student of alcoholic material from gaining any just idea of the proportions of the living animal, while its rich violet or crimson coloration is almost wholly lost.

Dr. J. I. Peck discussed the pteropods of the "Albatross" voyage around the Horn, but the very few collected, and the small number of stations, render generalizations on his material of very little weight.

The rapid dissolution of the fragile pteropod shells under the influence of the carbon dioxide contained in sea water at considerable depths is absolutely certain, and unless the dead shells were almost immediately recovered by the dredge, no trace would remain of them. It is probable that a very few months are all that is needed to completely dissolve the shell of a Cavolina or Cleodora. In regions where there is a considerable quantity of organic lime-material on the bottom, as off St. Augustine, Florida, in 400 fathoms, the small pteropod shells are well preserved, but in the deeper and more argillaceous areas they are found with extreme rarity, though abundant on the surface. Hence little can be safely predicated from the absence of pteropod shells on a given bottom, and it is absolutely unsafe to base generalizations of distribution upon negative evidence of this kind.

The season of the year and the state of the great oceanic currents has much to do with the abundance and even the presence of pteropods. In the Pacific the writer has made some twenty-six voyages between California and the Aleutian Islands, on nearly all of which a tow net was kept going. Consequently a tolerably full series of observations has been made on the area northeast of a line drawn from San Francisco to Unalashka Island. The chief oceanic current in this area is the enfeebled remnant of the Kuro Siwo and its deflected northerly and southerly arms. A drift of Arctic water southward is noticeable near the passes between the Aleutian Islands. The latter brings Clione and Limacina from Bering Sea, and the latter genus reaches, on the southerly arm, or coastal current, sometimes as far south as Monterey, California.

The Kuro Siwo is at the height of its strength and temperature in the early part of September in this region. Its surface water 300 miles off shore sometimes rises as high as 68° Fahrenheit, though the heat is rapidly given off to the atmosphere after the coast is reached, and the southerly arm off San Francisco has a temperature of only 54° Fahrenheit. The warm belt is never more than fifty miles in width in the area in question. The current is imperceptible, as such, in winter and early spring, when one encounters only northern pteropods. At this season, and well up to July, no pteropods of the genera Cleodora, Cavolina, Pneumodermon, and Corolla were taken north of latitude 38°. After this time the Kuro Siwo water begins to be noticed in the temperatures, and the forms mentioned are more or less prevalent in small swarms. In September they exist in great abundance, brought in the warm water as far north as latitude 50° and less abundantly to latitude 54°.

The Cavolina, Cleodora, and Pneumodermon are apt to appear (when present in the area) at the surface during calms, especially if the sun be overcast. The last mentioned genus is particularly noticeable from the disturbance caused by the rapid movements of its large and powerful flippers. Its motions recall those of humblebees over a field of clover. If a breeze of any strength springs up, the pteropods sink to a calmer stratum. I am unable to say positively that they are habitually crepuscular, but it is a fact that my largest hauls have been made about sundown. These animals are not equally distributed over the sea, but are distinctly gregarious, occurring in large swarms, which are trailed out into long bands by the action of the winds. Adjacent tracts of ocean may be almost destitute of pteropods. I was much surprised in opening the stomach of a large sunfish taken off Point Reyes, California, to find it crammed with Cleodora. That such a slow and clumsy creature as *Orthagoriscus mola* could gorge itself with the nimble pteropods was indeed remarkable. Another fact of interest was developed by the examination of molluscan fragments found in the stomachs of the Pacific salmon fresh from the sea, sent me by Professor Kofoid of the University of California for identification. These consisted almost exclusively of Spiralis and Limacina, showing that the last meal of the fish had been taken in cold water. In the Northeast Pacific I have not taken these two genera in the open sea, but only near shore in the colder coast currents.

The form collected by me in 1865 and 1871, and from living specimens of which carefully enlarged colored figures were drawn, differed so much from the figures given by Rang, Souleyet, and other authors as representing the Mediterranean *tridentata* (= *telemus*) that it seemed impossible that both should belong to the same species, but pending further investigations I gave it in my notes the varietal name of *C. occidentalis;* the large Atlantic form, or anything corresponding to the Mediterranean animal not having been obtained in the Northeast Pacific during fifteen years of collecting.

The following notes were made upon the animal[1] (see plate **12**, figures 1, 1*b*, 1*c*.). The fully adult shell measures 9 mm. long, 6 mm. in greatest width, and 5 mm. in greatest convexity. The "appareil de fermature" consists of a tooth-like process projecting on each side from the ventral plate and entering a depression in the inner side of the dorsal plate. The ventral lip is strongly constricted close to its narrowly reflected anterior margin. The posterior median spine is usually decollate at the tip. The back has a broad median and two narrower lateral obscure ridges ending at the thickened "bridle" or concentric callous ridge characteristic of this species; the ventral plate is most convex in front, where it is suddenly constricted; the portion near the aperture strongly marked by concentric whitish impressed lines with wider interspaces, though these do not interrupt the smoothness of the surface. The "hood" or produced margin of the dorsal plate, instead of being produced in a nearly continuous plate as figured by Boas for *C. tridentata* (=*telemus*), is bent ventrally in a curved manner over the aperture, and about half the anterior convexity of the ventral plate is thus overshadowed. The whole shell is shorter and more globose than the Mediterranean form as figured by Boas, and the lateral slits behind the interlocking processes form a straight even line, not arcuate and anteriorly expanding, as in the figures referred to.

It seems amazing that, with the opportunity at Naples and elsewhere, neither the author of the "Challenger" Report, Boas, nor any other recent writer on these animals, has troubled himself to give a drawing from life of the animal forming the type of the genus, nor even a careful description of its external characters while living. So we are obliged to fall back on the drawings and engravings of the field naturalists of half a century ago, whose discrimination of species from the life is treated with so little consideration by the histologists of to-day.

Pelseneer has given us an excellent generalized description of the anatomy in his "Challenger" Report, comparing it with the more archaic Cleodora. But no attempt is made by him to compare all the anatomical features of the several species among themselves in this genus. Any one, however, who compares the best existing figures of the living animal, such as those in the voyage of the "Bonite," will be struck by the extreme differences between any one of them and the animal about to be described.

The animal swims on its back, the ventral surface of the parapodia uppermost, advancing by a jerking motion due to the simultaneous flapping of the parapodia at the average rate of eighty strokes to the minute.

When weary, the animal contracts the parapodia, which are then turned backward, partially overlapping each other and folded fan-wise before being withdrawn into the shell (see figure 1*b*). When fully expanded, the parapodia in the present species have their front edges in a nearly straight line, slightly notched medially, and extend about four times the width of the shell, or some 20 mm. When folded preparatory to complete retraction, they are contracted about one-fourth of their extent.

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[1] U. S. N. Mus. 110,591.

The parapodia are roughly triangular with the anterior margin longest, the lateral margin distinctly trilobate and passing imperceptibly into the posterior lamina, which is slightly reflected over the reflected anterior edge of the ventral plate. In no case was this lamina seen to extend over the convexity of the ventral plate, as it is asserted to do in the Mediterranean species. If the dimensions of the figures of the animal in the plates of the "Bonite" are taken from the fully expanded animal (which I strongly doubt), they are hardly half as large as those of our Pacific variety. But the contractibility of these delicate organs is so excessive that in a dead or exhausted specimen the real extent of the fins is never shown, much less in one which has been subjected to a preservative fluid. The appendages of the mantle which extend from the lateral slits are short and also trilobed, but not deeply; in the Mediterranean form they are represented as entire or obscurely bilobate, and longer. The color of the living animal is translucent yellowish, with two large, sharply defined dark violet spots on the parapodia, and a paler violet of some of the viscera shining through the shell. In the Mediterranean form the violet is represented as gradually fading out toward the edge of the parapodia, but in the Pacific variety the violet area is dark up to its extreme edges and not graduated in any way. The anterior edge is mesially indented; behind and above it extend two small tentacles (figure 1*c*) minutely swollen at their distal ends. The right-hand one is about twice as long as the left one. The mouth is axial in its longest diameter, narrow, with raised margin slightly pointed in front.

In captivity in a bowl of fresh sea water the individuals kept up swimming for some time. When exhausted, they drew in the parapodia and slowly sank to the bottom of the bowl. After a rest they would resume their activity, and several of them lived for three days, the water being frequently renewed.

The most nearly related species, so far as the soft parts are concerned, to our Pacific variety is *C. gibbosa* Rang, as figured by D'Orbigny in the Voyage dans l'Amerique Méridionale, but this species has a shell of quite different form.

Hyalaea truncata Krauss (1848), which appears to be the same as *H. cumingi* Deshayes (1877), seems to me from authentic specimens to be a distinct species. It is reported from the South Atlantic in latitude 40° S., the Cape of Good Hope, and the Indian Ocean.

The very great discrepancy in size of extreme mutations of the species of Cavolina has led to the separation of some of them as distinct species, but we have in such genera as Cypraea and Marginella other instances of such discrepancies between individuals of the same species. Individuals of a single swarm are usually nearly identical in size, according to my observations. It is therefore not improbable that the discrepancies observed are due to some conditions of food supply or temperature which have affected a particular swarm during its period of adolescence, which is presumably very short.

Cavolina uncinata Rang.

Hyalaea uncinata Rang (MS.), in D'Orbigny, Voy. dans l'Am. Mérid., 1836, p. 93, pl. **5**, figs. 11–13.
Cavolina uncinata Gray, Cat. Moll. Brit. Mus., 1850, **2**, Pteropoda, p. 7.

Station 3422, U. S. S. "Albatross," off Acapulco, Mexico, U. S. N. Mus. 123,071; stations 3354 and 3392 in the Gulf of Panama; and station 3398 off the coast of Ecuador.

General distribution in the Atlantic from off Martha's Vineyard, Massachusetts, in about latitude 41° N. south to latitude 20° 30′ S., eastward to the Cape of Good Hope, the Indian Ocean, and the Bay of Bengal; the China and Japan seas in the Western Pacific, and in the Eastern Pacific from the equator to Cape St. Lucas in about latitude 23° N. It was found by Grayson very abundant on the surface near the entrance to the Gulf of California.

Cavolina longirostris Lesueur.

Hyalaea longirostris Lesueur (MS.), in Blainville, Dict. Sci. Nat., 1821, **22**, p. 81.
Hyalaea limbata D'Orbigny, Voy. dans l'Am. Mérid., 1836, p. 101, pl. **6**, figs. 11–15.
Cavolina longirostra Gray, Cat. Moll. Brit. Mus., 1850, **2**, Pteropoda, p. 8.

U. S. S. "Albatross," stations 3407 and 4751, near the Galapagos Islands; U. S. N. Mus. 123,072; and station 3422, off Acapulco, Mexico.

General distribution, in the Atlantic, from about latitude 42° N., south to latitude 40° S.; eastward to the Indian Ocean, Red Sea, Australia, the Philippines, and Japan; and in the Eastern Pacific from latitude 23° N. to latitude 12° S.

This is perhaps the most abundant, widely distributed, and variable species of the genus. Adult specimens vary from 7.5 × 6.0 mm., to 3.0 × 2.25 mm. in length and width.

While discussing the pteropods, it may be mentioned that *Clio sulcata* Pfeffer, was obtained off Manta, Ecuador, by the "Albatross" in 1888; and *Cavolina inflexa* Lesueur, and *Limacina inflata* Orbigny, were dredged off Cerros Island, Lower California, in 1889.

OPISTHOBRANCHIATA.

Tectibranchiata.

Acteonidae.

ACTEON Montfort.

Acteon Montfort, Conch. Syst., 1810, **2**, p. 314; type *Voluta ternatilis* Gmelin: not *Acteon* Fleming, 1828, or *Actaeon* Oken, 1815.

Solidula (sp.) Fischer, Mus. Demidoff, 1807, p. 226; Tabl. Synopt. Zoogn., 1808, p. 126; type *Voluta solidula* Linné.

Tornatelle Lamarck, Extr. du Cours de Zool., 1812, p. 117; not latinized, no species cited.

Tornatella Lamarck, An. s. Vert., 1822, **6**, p. 219.

Speo Risso, Hist. Nat. Eur. Mérid., 1825, p. 235; type *S. bifasciatus* Risso, l. c. fig. 107.

Actaeon Voigt, in Cuvier, Das Thierr., 1834, **3**, p. 201, not of Oken, 1815; Meek, Amer. Journ. Sci., 1863, ser. 2, **35**, p. 87; and the majority of authors.

Kanilla Sowerby, Edin. New Phil. Journ., 1833, **15**, p. 367, *nomen nudum*.

As Montfort says nothing to connect his *Acteon* with the mythological proper name *Actaeon*, their identity is a pure assumption, and I therefore return to the original mode of spelling used by Montfort, Cuvier, D'Orbigny, Agassiz, and others of the earlier writers who adopted it.

The genus is represented on the west coast of America in the recent fauna by the following groups:

Acteon s. s. Spire produced, outer lip simple not thickened, a single plait upon the pillar, continuous with the anterior margin of the aperture and with no sulcus or canal anteriorly. Type *A. tornatilis* Gmel.

Rictaxis Dall, 1871 (*Actaeonidea* Gabb, 1873). Like *Acteon*, but with the anterior end of the pillar truncate and projecting. Both the above operculate. Type *A. punctocoelata* Carpenter.

Microglyphis Dall, 1902. Shell short and swollen, pillar with two distinct plaits and a well-marked siphonal sulcus anteriorily. Inoperculate. Type *A. curtulus* Dall.

This last group resembles *Tornatellaea* (*bella*) Conrad, 1860, described from the so-called "Lignitic" of Alabama, but the latter differs by its thickened and, in the mature condition, denticulate outer lip, and peculiar acute nepionic shell which is quite unlike that of any recent form of Acteon known to me. Conrad's original figure was taken from an immature specimen. Tornatellaea is not known in the recent state. M. Cossmann has brought together indications of a large number of forms belonging to this family, but, unfortunately, the photographic figures by which they are illustrated are so imperfect that it is in many cases quite impracticable to gain from them any idea of the exact characters of the specimen figured.

Acteon panamensis Dall, n. sp.

Plate 11, figure 6.

Shell with the apex badly eroded, but apparently blunt, with about four whorls, the last much the largest; spire shorter than the aperture; suture strongly marked, the whorl in front of it abrupt, but not channelled; periostracum pale yellowish, nearly transparent, polished; sculpture of (on the penultimate whorl four) sharp distant spiral, fine, microscopically punctate, incised lines; these increase on the last whorl to about fifteen, of which five or six on the base are closer, the remainder, on the sides of the whorl, are less crowded, subequidistant, and similar; shell obscurely parallel-sided, slightly rounded, with a rounded and slightly protracted base; aperture narrow, rounded in front; the outer lip sharp, simple, or minutely notched by the incised spiral lines; body with a slight wash of callus; pillar straight, short, with a single obscure fold near the middle, which lags behind the aperture; there is no umbilical perforation. Lon., 7·0+; max. diam., 4.5 mm.

U. S. S. "Albatross," station 3392, in the Gulf of Panama, in 1270 fathoms, hard bottom, bottom temperature 36°.4 F. U. S. N. Mus. 123,074.

No species at all similar is reported from this part of the world, and hence, though the spire is imperfect, it has seemed best to name it.

Acteon (Microglyphis) mazatlanicus Dall, n. sp.

Plate 5, figure 7.

Shell small, polished, white, acute, five-whorled, the spire shorter than the aperture; nucleus glassy, small, sinistral, mostly immersed in the following whorl; suture distinct, not channelled or appressed; early whorls moderately rounded, with extremely faint traces of spiral striation or smooth; last whorl obscurely angulate at the shoulder, above which the whorl slopes flatly toward the suture, remainder of the whorl evenly ovately rounded; sculpture of extremely fine, sharp, close-set spiral striae, with a tendency to pair, slightly less crowded behind the shoulder and more crowded on the base near the pillar; these striae are crossed by faint, irregularly distributed, slightly raised lines of growth, and are more or less microscopically punctate; periostracum imperceptible; outer lip thin, simple, sharp, slightly patulous toward the middle, and receding near the suture; pillar arcuate, truncate obliquely, and with two strong spiral plaits, the anterior of which is seated on the edge of the truncation and is continuous with a distinct notch at the end of the pillar, around which it passes imperceptibly into the margin of the lip; body with a faint wash of callus; base imperforate. Lon., 5.5; of spire, 2.3; max. diam., 3.0 mm.

U. S. S. "Albatross," station 3431, in 995 fathoms, mud, off Mazatlan, Mexico, bottom temperature 37°.0 F. U. S. N. Mus. 123,075.

This species is more acute and more closely sculptured than *A.* (*M.*) *breviculus* of the California coast, while the spire is more acutely pointed and the spiral sculpture more close-set than in *A.* (*M.*) *perconicus*, which approaches it more closely than either of the other known species of this subgenus.

The group is apparently characteristic of the West American coast from California to Cape Horn, but will probably be found elsewhere, in great depths of water.

Acteon (Microglyphis) estuarinus Dall, n. sp.

Shell small, white, plump, with a very short, rather acute spire, and swollen last whorl; there are four and a half closely coiled whorls, the nucleus being sinistral and sunken; when fresh, the shell is of a translucent pinkish white, the thicker parts near the suture are more opaque and give the effect of a white band in front of the suture; the general form resembles that of *A.* (*M.*) *curtulus*, though the shell, with the same number of whorls, is much larger, the spire less evenly dome-like, and the nucleus more sunken; suture very distinct, almost channelled; sculpture of fine, close-set, minutely punctate spiral lines, hardly visible without a lens; aperture with a well-marked anterior sulcus or canal; anterior plait on the pillar strong, prominent, the posterior plait weaker, and ending further within the aperture, but quite distinct. A very thin wash of callus on the body; outer lip thin, simple. Alt., 5.5; diam., 3.7; spire above the last whorl, 1.0 mm.

U. S. S. "Albatross," station 3194, off Estero Bay, California (N. Lat. 35° 23′ 30″), in 92 fathoms sand, bottom temperature 45°.9 F.

It may be accidental, but two living specimens were both without the operculum, which is present in the littoral species of Acteon. The species of Microglyphis at present known are:

M. estuarinus Dall,	off	Estero Bay, Cal.,	in	92 fms.
M. breviculus Dall,[1]	"	Sta. Rosa Id., Cal.,	"	53 "
M. mazatlanicus Dall,	"	Mazatlan, Mexico,	"	995 "
M. perconicus Dall,	"	Galapagos Ids.,	"	812 "
M. curtulus Dall,	"	Magellan Strait	"	122 "

The temperature of the water in which they lived was 37° to 48° F., and the bottom either sandy or muddy.

Scaphandridae.

SCAPHANDER Montfort.

Scaphander Montfort, Conch. Syst., 1810, **2**, p. 334, type *Bulla lignaria* Linné.
Assula Schumacher, Essai, 1817, pp. 78, 258.

The species of this genus are readily recognized, but the smaller forms belonging to the family are often so similar to Acteocina (Gray, 1847, type *Actaeon wetherilli* Lea, better known as Tornatina A. Adams, 1850) that in the absence of the soft parts the reference of the shell to a particular group must be regarded as merely provisional.

The nomenclature of the groups is also in an uncertain state, its final arrangement depending upon the anatomical characters as yet unknown. If we must follow the extremists and reject such a name as Cylichna Lovén, on account of the prior existence of Cylichnus Burmeister, as has been pointed out by Pilsbry we must take the next valid group-name given to any part of the genus for the generic name and let subsequent appellations take precedence only in conformity with the order of their dates.

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[1] See Plate **15**, figure 12.

Scaphander cylindrellus Dall, n. sp.

Plate 8, figure 1.

Shell subcylindric, thin, white, covered with a pale straw-colored periostracum, the aperture as long as the shell, with one and a half visible whorls; apex occluded except the last whorl and a half, which rise above and conspicuously overhang the spiral excavated callous deposit, which is also deeply concave at its distal edge where it meets the aperture; posterior margin raised above the edge of the preceding whorl in an even spiral, not produced at its termination as in most species of this genus; surface covered with minute spiral threads, mostly paired, the interspaces between the pairs usually wider than the threads and often wider than the pairs, the width decidedly irregular; the axial sculpture of small equal threads subequally spaced and crossing the spiral interspaces, but not overriding the spiral threads; the reticulum formed is rectangular and does not give the effect of punctation; aperture somewhat wider in front, but not flaring, as in most species of the genus; outer lip thin, body with a thin callus extending on to the pillar which is not gyrate and has no chink behind it; axis not pervious; anterior and posterior parts of the aperture excavated. Lon. of shell, 33; max. diam., 16 mm.

U. S. S. "Albatross," station 4672, 88 miles southwest of Palominos Light, Peru, in 2845 fathoms, infusorial ooze, bottom temperature 35°.2 F. U. S. N. Mus. 110,563.

This species is much thinner and even more cylindrical than *S. gracilis* Watson, which is its nearest ally in the genus.

Scaphander interruptus Dall.

Plate 19, figure 9.

Scaphander interruptus Dall, Proc. U. S. Nat. Mus., 1889, **12**, p. 297, pl. **12**, fig. 12.

U. S. S. "Albatross," station 2788, on the southern coast of Chile, in 1050 fathoms, mud, bottom temperature 37° F.; station 2807, near the Galapagos Islands, in 812 fathoms, ooze, temperature 38°.4; station 3392, in the Pacific west of the Gulf of Panama and northwest of the Galapagos Islands, in 1270 fathoms, hard bottom, temperature at bottom 36°.4 F. U. S. N. Mus. 123,077. One of the specimens obtained was living.

Fragments were also obtained at station 3360, in 1672 fathoms, sand, temperature 42°; and 3393, in 1020 fathoms, mud, temperature 36°.8, both in the Gulf of Panama.

The species is more conical than *S. cylindrellus*, the apex wider, more blunt, and the spire less sunken. The sculpture is stronger and relatively coarser in the young shell above described. A fragment of an adult measures about 30 mm. in length and 15 mm. in diameter; on it the sculpture is nearly obsolete; the loss of the periostracum may account for part of the difference, but that there was originally a considerable disparity is certain.

Scaphander decapitatus Dall, n. sp.

Shell subcylindric, anterior and posterior ends about equally rounded, white, covered with a pale yellowish, thin, polished periostracum; apex with a small dimple, hardly a perforation, the edge of the aperture coiled around but hardly beyond the margin of the apex; axial sculpture only of faint lines of growth; the posterior fourth of the shell with numerous close, fine spiral striae, but no punctations; the middle part is without spirals; the anterior part with a few sparse, irregularly disposed spiral striae and numerous very faint, almost microscopic striulae; aperture as long as the shell, not produced or channelled behind; outer lip thin, nearly straight; body with a faintly granular, white, thin wash of callus; pillar thin, short, very obliquely attenuated. Lon. of shell, 15; max. diam., 8 mm.

U. S. S. "Albatross," station 3683, in Mid Pacific, N. latitude 9° 57′ W., longitude 137° 47′, in 2690 fathoms, radiolarian ooze, bottom temperature about 35° F. U. S. N. Mus. 110,746.

From the fact that the outer lip is not channelled or produced behind the apex of the whorls, this species has somewhat the aspect of a Cylichnium. The absence of punctation is also unusual; but the shell has more the look of a Scaphander than anything else, and, in the lack of any knowledge of the soft parts, more exact reference to its place in the system must at present be deferred.

Sabatia Bellardi.

SABATINA Dall, nov.

The callosity on the body of the species of this subgenus in most if not all cases does not form a "fold." It is an amorphous mass, sometimes granular or smooth, but occasionally with a tubercular surface. The typical species, if correctly figured, does seem to have the callus produced into the interior, but the recent species without exception differ from Bellardi's fossil, not only in the character of the callus, but also in their globose, instead of pyriform, shell. For the globose recent species, therefore, I propose the name *Sabatina* with *S. planetica* Dall, as type. They have an animal capable of retiring wholly into the shell, and gastroliths exactly of the type found in *Scaphander lignarius*. A large foraminifer was found in the stomach of the following species.

Scaphander (Sabatina) planeticus Dall, n. sp.

Shell small for the genus, creamy white, of about four whorls; spire much more exposed than in the majority of species, the edges of all the whorls being visible, though in the specimen somewhat eroded; shell heavy, solid, widest behind, with the spire very low and the last whorl with a bluntly rounded shoulder behind which it is obscurely flattened; last whorl much the largest; axial sculpture starting from the distinct but shallow suture in the form of small arcuate retractive wrinkles, about four to a millimeter, which soon become obsolete, being hardly visible beyond the shoulder of the whorl; spiral sculpture of conspicuous close spiral lines of shallow but distinct punctations, the interspaces being flat and polished; aperture ample, somewhat patulous, outer edge thin and sharp; body with a heavy smooth white callus; pillar arcuate, callous, passing imperceptibly into the anterior margin of the aperture; gastroliths of exactly the same type as those of *S. lignarius.* Lon. of shell, 8; max. lat., 5.5 mm.

U. S. S. "Albatross," station 3684 in Mid Pacific, N. latitude 0° 50′, W. longitude 137° 54′, in 2463 fathoms, ooze, bottom temperature 35° F. U. S. N. Mus. 110,748.

None of the species with which I have compared this one have the spire exposed, but it may well be that this is not a character of extreme importance. The most conspicuous feature of this species, after the exposed spire, is the anterior attenuation of the profile, the main part of the penultimate whorl being in the posterior third of the shell.

CYLICHNELLA Gabb.

Bullina Risso, Hist. Nat. Eur. Mer., 1826, **4**, p. 51; not of Férussac, 1822.
Cylindrella Swainson, Mal., 1840, pp. 135, 326 (not p. 311); not of Pfeiffer, 1840.
Cylichna Lovén, Index Moll. Scand. Occid., May, 1846, p. 10, 1st sp. *C. cylindracea* Pennant. Not *Cylichnus* Burmeister, Handb. Entom., 1844, **4**, 171.
> *Cryptaxis* Jeffreys, Ann. Mag. N. Hist., 1883, 5th ser., **11**, p. 400; not of Lowe, 1854, nor Reuss, 1865.
? *Mnestia* H. & A. Adams, Gen. Rec. Moll., 1854, **2**, p. 10.
> *Cylichnella* Gabb, Proc. Acad. Nat. Sci. for 1872, Feb., 1873, p. 273 (type *Bulla bidentata* Orb.).
Bullinella Newton, Syst. List. Edw. Coll., 1891, p. 265.
Clistaxis Cossmann, Essais Pal. Comp., 1895, p. 90.
Cyclina Gray, Guide Moll., 1857, **1**, p. 195; not of Deshayes, 1850, nor *Cyclinus* Kirby,[1] *Coleoptera*, 1837.

Swainson, in his Malacology, applied the name Cylindrella first to the present genus, and secondly to a Cone. In the latter case it may be surmised its use was accidental, perhaps a heterophemism for Cylinder. At any rate the latter use is ignored in the index to his volume. It is uncertain which use of Cylindrella was prior, Swainson's or Pfeiffer's; the latter having also used the name (for landshells of the genus Urocoptis Beck) in 1840. The presumption, however, is in Pfeiffer's favor, in comparison with Swainson. It would be a pity to resurrect a name so well known in so unfamiliar a connection. Cylichnus Burmeister is a barbarism, and cannot be derived by any recognized rule of orthography from the Greek κυλίγνη, from which we might obtain Cylichnes or Cylichnium, as well as Cylichna. The latter might thus be plausibly held until it be shown that Cylichnus is a masculine form of it. I do not like to use Mnestia for the genus, thinking it highly improbable that the colored species for which that name was proposed are identical with the group typified by *C. cylindracea* Pennant. The next name in order of date is Cylichnella Gabb, the shell of which differs from Cylichna by having two distinct plaits on the pillar instead of one, and since this has been recognized by Gabb, Pilsbry, and others as a distinction of rank not greater than subgeneric Cylichnella will become the generic name with the species formerly grouped under Cylichna now forming a subgenus with the name of Bullinella Newton. It is of course understood that with the general knowledge of the anatomy some revision will undoubtedly be called for.

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[1] ince one of these names has to be changed on account of their similarity, I would propose for Deshayes's genus the name *Eocyclina.*

The genus may be subdivided as follows:

A. Shell Unicolorate, Cylindric.

Cylichnella Gabb, s. s., type *C. bidentata* Orb. Pillar with two distinct plaits.

Bullinella Newton, type *C. cylindracea* Pennant. Pillar with a single plait.

Cylichnium Dall, *nov.*, type *Utriculus domitus* Dall. Pillar simple, aperture ample in front.

B. Shell Versicolored, Subovate.

Mnestia H. and A. Adams, type, *C. marmorata* Adams.

Cylichnella (Bullinella) inca Dall, n. sp.

Plate 11, figure 3.

Shell small, white, with a pale yellowish periostracum (mostly eroded), the aperture as long as the shell; spire entirely and deeply immersed, leaving only a small deep cylindrical perforation at the apex; summit of the whorls rather evenly rounded, except where slightly indented by the more pronounced incremental irregularities; sides nearly parallel, the posterior end, if anything, with a slightly greater diameter; surface smooth (where not eroded) except for lines of growth; middle of the shell a trifle constricted; body with a light wash of callus; outer lip thin, sharp; pillar a little twisted with a faint trace of a revolving ridge upon it; anterior end rounded. Lon., 6; max. diam., 2.5. mm.

U. S. S. "Albatross," station 3392, off the Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 N. U. S. Nat. Mus., 123,080.

Cylichnella (Cylichnium) pizarro Dall, n. sp.

Plate 11, figure 1.

Shell small, subcylindric, blunt behind, with the spire immersed, showing only a minute apical perforation; yellowish white with a thin, translucent polished periostracum; inner lip with a thin wash of callus; outer lip behind appressed toward but not quite touching the apex of the last whorl, gyrate, laterally straight, the lateral profile gently, convexly arcuate; margin thin, simple, slightly produced and excavated in front, and passing with but a hardly perceptible angle into the short straight pillar; over the latter is a wash of callus, but behind it no umbilical chink; sculpture of fine, close, spiral lines, microscopically punctate, and tending to arrange themselves in pairs; near the shoulder of the whorl are six or seven much stronger subequal and nearly equidistant spirals, apparently not punctate; inner lip quite smooth and the pillar unarmed; axis not pervious. Lon., 9.75; max. lat., 5.0 mm.

U. S. S. "Albatross," station 3392, off the Gulf of Panama in the Pacific, in 1270 fathoms, bottom temperature 36°. 4 F. U. S. N. Mus. 123,079.

The form of this species is not unlike that of *Cylichna crispula* Watson, from North Australia, but the latter is a very much smaller shell, has the outer lip more produced behind the apex, and the aperture in front more contracted.

Cylichnella (Cylichnium) atahualpa Dall, n. sp.

Plate 11, figure 2.

Shell small, elongate, white with a pale yellowish periostracum which shows reddish brown in the incised sculpture; the aperture as long as the shell, the general form attenuated toward the extremities, especially in front, but moderately convex near the middle of the whorl; spire entirely concealed, the summit forming a shallow funnel, owing to the gyration of the posterior margin, about half of which is occupied by a deep rounded sulcus; apex imperforate but with a reflected edge of callus on the body, forming a chink at the bottom of the funnel; exterior polished, smooth except for faint lines of growth, but with a very few fine incised punctate lines close to the anterior and posterior margins of the shell; body with a thin callus with a brown line at the outer edge; outer lip thin, sharp; aperture narrow, deeply sulcate at each end; pillar simple, gyrate but not pervious, short and thick, with a little callus reflected upon it. Lon., 9; max. diam., 4 mm.

U. S. S. "Albatross," station 3354. Gulf of Panama, in 322 fathoms, mud, bottom temperature 46° F. U. S. N. Mus. 123,081.

Bullariidae.

BULLARIA Rafinesque.

Bulla Linné, Syst. Nat., 1758, ed. 10, p. 725; 1767, ed. 12, p. 1181; not of Linné. op. cit., ed. 10, p. 427, nor of Muller, Prodr. Zool. Dan., 1776, p. 212.

Bullus Montfort, Conch. Syst., 1810, **2**, p. 330. Type *B. ampulla* L.
Bullaria Rafinesque, Anal. Nat., 1815, p. 142; new name for *Bulla* Linné.
Bullea Blainville, Malac., 1825, pp. 477, 626; not of Rafinesque, 1815.
Gondole Latreille, Fam. Nat. Règne Anim., 1825; German edition p. 171 (not *Cymbium*, as stated by H. and A. Adams, **2**, p. 15).
Vesica Swainson, Malac., 1840, p. 360; not of the Mus. Calonnianum, 1797.

Linné first used the name Bulla for a subgenus of Gryllus (Orthoptera) and only subsequently applied it to a mollusk. The latter use, therefore, cannot prevail. As for M. Cossmann's reference to Klein, if we are to consider pre-Linnean authors, we must carry the name half a century further back and give his due to Rumphius.

Bullus Montfort, must be excluded by the same rule which is invoked against Cylichna. The next name in order of date is Bullaria of Rafinesque. Dumeril's quadrinomials being excluded as non-Linnean nomenclature, his Bullarius has no standing and does not exclude Rafinesque's name, which is accordingly adopted, the more readily as it recalls the more familiar Bulla of authors.

Among recent Bullaria two groups may be readily noted, the large brownish mottled forms from shallow water like *B. ampulla* L., the type of the genus, and the small, white, or nearly white species of the deep-sea fauna. For the latter with *Bulla abyssicola* Dall, as type, I propose the sectional name of LEUCOPHYSEMA.

Bullaria (Leucophysema) morgana Dall, n. sp.

Plate 11, figure 4.

Shell small, yellowish-white, short-ovate; apex perforate, showing about half a turn of the involved spire; summit rounded, smooth; surface smooth except for more or less evident lines of growth and about twenty-two spiral incised lines, strongly punctate, between the summit and the anterior end; these lines are nearly equidistant and a little less deep on the periphery of the whorl than toward the extremities; outer lip gently arcuate forward, thin, simple; body with a thin white callus; pillar short, concavely arcuate, callous, and reflected. Lon., 5.5; max. diam., 4.0 mm.

U. S. S. "Albatross," station 3392, off the Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.04 F. U. S. N. Mus. 123,082.

All the Nudibranchs and a part of the Tectibranchs, Gastropteron, and Marseniidae, having been sent to Doctor Rudolph Bergh of Copenhagen, it is not necessary to do more in regard to this part of the collection than to refer to his paper. Bulletin of the Museum of Comparative Zoölogy, **25**, number 10, entitled "Die Opisthobranchien," comprising 110 pages and twelve plates, October, 1894.

Further information on the mollusks of these groups derived from this general region will be found in the paper by the same author in the Zoologische Jahrbuch, 3, Suppl. 4, 1898, entitled "Die Opisthobranchier der sammlung Plate," and comprising 100 pages and six plates.

CTENOBRANCHIATA.

ORTHODONTA.

Toxoglossa.

Terebridae.

TEREBRA BRUGUIÈRE.

Terebra Bruguière, Encycl. Méth., Vers, 1789, **6**, p. xv, no. 47 (no species mentioned); Lamarck, Prodr., 1799, p. 71, no. 15 (type *Buccinum subulatum* Linné); Syst. An. s. Vert., 1801, p. 78 (sole ex. *B. maculatum* Linné); An. s. Vert., 1822, **7**, p. 283; Encycl. Méth., atlas, 1816, pl. **402**; not of Mus. Calonnianum, 1797.

Epitonium (*pars*) Bolten, Mus. Bolt., 1798, p. 93, sect. 3.

Acus (Anonymous) Mus. Calonnianum, 1797, p. 31 (first identifiable species *Buccinum lanceatum* Linné); not *Acus* Edwards, 1771.

Vertagus Link, Beschr. Rostock Samml., 1807, p. 128 (first species *Buccinum maculatum* Linné), = *Terebra* Lam.

Terebrum Montfort, Conch. Syst., 1810, **2**, p. 430 (type *T. subulatum* L. sp.), = *Terebra* s. s. Lam.

Terebraria Rafinesque, Analyse de la Nature, 1815, p. 145 (new name for *Terebra* Brug.).

> *Subula* Schumacher, Essai, 1817, p. 233 (sect. *α* *Buc. maculatum* L.; sect. *β* *Buc. dimidiatum* L.).

> *Acus* Gray, P. Z. S., 1847, p. 139; Guide Moll., B. M., 1857, p. 6; *A. maculatus* Linné; not *Acus* Edwards, 1771.

> *Subula* Gray, Guide Moll. B. M., 1857, p. 6; *S. dimidiata* Linné.

> *Leiodomus* Gray, Guide Moll. B. M., 1857, p. 6. *L. caerulescens* Lam.; not *Leiodomus* Swainson, 1840.

> *Turricula* Herrmannsen, Index Gen. Mal. Suppl., 1852, p. 137 (as of J. Hermann, 1783); not of Schumacher, 1817.

> *Acus* H. and A. Adams, Gen. Rec. Moll., 1853, **1**, p. 224; type cited *A. maculata* L. sp.

> *Abretia* H. and A. Adams, l. c., p. 225; first species *Terebra cerithina* Lam.

> *Hastula* H. and A. Adams, l. c., p. 225, no type selected (not *Hastula* Miller, Lepid., 1857); Tryon, Struct. Syst. Conch., 1883, **2**, p. 182 (*Terebra strigillata* Lam. non Gmelin, selected as type); Fischer, Man. de Conchyl., 1883, p. 587.

> *Euryta* H. and A. Adams, l. c., p. 225, 1st sp. *T. aciculata* Lamarck (not *Euryta* Gistel, 1848) = *Mazatlania* Dall, 1900.

> *Myurella* Hinds, in Sowerby, Thes. Conch., 1844, **1**, pt. 5, p. 171, no type selected; Herrmannsen, Index Gen. Mal., Suppl., 1852, p. 89, selects *Terebra myuros* Lamarck (not *Myurella* Fischer, Man. Conch., 1883, p. 587, *T. armillata* Hinds).

> *Impages* E. A. Smith, Ann. Mag. N. Hist., 1873, 4th ser., **11**, p. 263; type *Terebra coerulescens* Lamarck; Fischer, Man. de Conchyl., 1883, p. 587.

> *Strioterebrum* Sacco, Moll. Terz. Piem , 1891, **10**, p. 33; type *Terebra basteroti* Nyst.
> *Spineoterebra* Sacco, l. c., 1891, p. 58; type *Terebra* var. *spinulosa* Doderlein. fos. Tortonian.
> *Fusoterebra* Sacco, l. c., 1891, p. 59; type *Fusus terebrinus* Bonelli, fossil, Tortonian.
> *Myurella* Cossmann, Essais Pal. Comp., 1896, **2**, p. 49 (*T. affinis* Gray) = *Strioterebrum* Sacco, but not *Myurella* Hinds, 1844.
> *Noditerebra* Cossmann, l. c., 1896, p. 51; type *T. geniculata* Tate, Miocene of Australia.
> *Mazatlania* Dall, Nautilus, 1900, **14**, p. 44; Proc. U. S. Nat. Mus., 1903, **26**, p. 951, note; new name for *Euryta* Adams, not of Gistel.
> *Oxymeris* Dall, Nautilus, Aug., 1900, **14**, p. 44; new name for *Acus* Gray, not of Edwards.
> *Perirhoë*, *Triplostephanus*, *Acuminia*, and *Duplicaria* Dall, Nautilus, Mar., 1908, **21**, p. 124.

The nomenclatorial status of the genus Terebra and its subdivisions has been very confused. This is largely due to an error of Quoy and Gaimard, who figured *Terebra subulata* with the eyes wrongly placed, thus leading the brothers Adams into the mistake of dividing the genus on this character. Hinds, in placing the description of his subgenus Myurella after, instead of before the description of the three species he referred to it, has betrayed several careless authors into error. A few notes on the nomenclatorial history may make the changes required more easily understood.

The shells of this genus were called Strombus by Rumphius, and the name Terebra, introduced by Adanson for a heterogeneous assembly, was adopted binomially by Bruguière, in 1789, and a type, *T. subulata* (Linné) supplied by Lamarck ten years later. The name Acus was proposed in the anonymous Museum Calonnianum in 1797, but according to Sherborn had been used by Edwards for a fish in 1771. The name Vertagus, proposed by Link as a substitute for Terebra, in 1807, is an exact synonym of Terebra as treated by Lamarck. Terebrum Montfort, 1810, is based on the type species of Terebra Lamarck, and Terebraria Rafinesque, is another change arbitrarily proposed for the same genus. Subula Schumacher was proposed as a substitute for Terebra, because that author thought the shells "had more the form of an awl than of an auger." He divided the group into two sections, of which the first was named Acus by Gray, in 1847, with the type *T. maculata*, for which Oxymeris was substituted by Dall, in 1900, Acus being preoccupied. The second section of Schumacher typified by *Terebra dimidiata* will retain Schumacher's name in a sectional sense.

The name Turricula (for *T. subulata*), alleged by Herrmannsen to have been used by J. Hermann in his "Tabula" in 1773, does not appear in that work, though the plural form is used (not in a generic sense) to cover a subdivision of the heterogeneous genus Buccinum.

Hinds proposed, in 1844, for three species of Terebra having mostly spiral sculpture, strongly nodulous sutural band, many slender whorls, and a thickened and projecting callosity on the inner lip in the adult, the name Myurella, based on the *Terebra myuros* of Lamarck, which was designated as type a little later by Herrmannsen. In 1873 E. A. Smith proposed the name Impages for *Terebra coerulescens* and a few similar species which were supposed to be characterized by a band of callus, extending over the body and somewhat behind the advancing suture.

The group named Euryta by Adams should doubtless be regarded as a distinct genus from Terebra proper, on account of its pervious axis and abbreviated nodulous form. The name being preoccupied for an Acaleph, the writer substituted Mazatlania in 1900. Spineoterebra Sacco, is proposed for a shell very similar to Mazatlania, but with a callous pillar, with a different canal and an impervious axis. The canal is so little indented that the siphonal fasciole is almost obsolete, and the keel, which usually marginates its posterior edge, is represented only by a slightly raised line of junction. Being doubtless the ancestor of Mazatlania and the name prior, it will take generic precedence, while Mazatlania will form a subdivision under it as a subgenus. Whether Cossmann's Noditerebra comes under Spineoterebra or is a variant of Strioterebrum is not clear from the description and rather obscure figure, and I have not been able to examine a specimen.

Having gone over the entire collection of recent Terebra in the National Museum, and tabulated the characters of each species, I have formulated the following arrangement. It should be premised, however, that apparently Hinds was quite right in concluding that so far as the shell characters are concerned, no rigorous lines of subdivision can be drawn within the genus, though groups which are for the great majority of the species perfectly recognizable may easily be segregated.

The larval shell throughout the group is the same, except in number of whorls. It is blunt, glassy, smooth, and forms a shorter or longer subcylindrical spire. It is usually dark-colored. The nepionic shell may agree in sculpture with the adult portion, or may be entirely different, its sculpture gradually becoming modified with growth. So far as reported the operculum is uniformly subannular, ovoid, narrow with a terminal nucleus.

The old genus Terebra is now admitted to be necessarily divided into four distinct genera as follows:

Terebridae.

Terebra Bruguière. Radula edentulous, the proboscis forming a voluminous, muscular, evertible sac, in which the prey may be enfolded and its juices squeezed out and absorbed. The presence of a poison gland may be explained by supposing the secretion to paralyse the living prey when taken into the sac. Eyes terminal on very short small tentacles, and a long slender verge without appendages, are present. Type *Terebra subulata* (Linné).

Hastula Adams. Radula with Toxoglossate teeth as in Conus, pierced for the secretion of a poison gland; eyes and tentacles present. Type *Terebra strigillata* Lamarck, not Gmelin.

Duplicaria Dall (*Myurella* Troschel, not Hinds). Radula with a double row of arcuate solid teeth, not pierced for secretion; no poison gland, eyes and tentacles wanting. Type *Terebra duplicata* Lamarck.

Spineoterebra Sacco. Shell with no presutural sulcus, the sculpture of knobby ribs, the siphonal fasciole and its posterior keel obsolete. Soft parts unknown. Type *Terebra* var. *spinulosa* Doderlein. Fossil of the Tortonian of Italy.

These genera are subdivisible on the basis of the shell, as far as now known, and the following groups seem recognizable.

TEREBRA Bruguière.

Subgenus (and section). Strioterebrum Sacco 1871.

Shell with uniform sculpture, relatively small, acute, a strongly marked presutural sulcus and band, whorls flattish with axial ribs and spiral sculpture, short canal or none, usually two keels on the pillar; the body is destitute of callus and without a raised pillar lip. Type *T. basteroti* Nyst.

A recent species is *T. dislocata* Say. Noditerebra Cossmann, does not appear to differ essentially.

Section Fusoterebra Sacco, 1891.

Like Strioterebrum but with the axial sculpture emphasized, the spiral sculpture absent or obsolete, the sulcus feeble, and the canal more or less elongated. Type *Fusus terebrina* Bonelli, Miocene.

A recent species of this group is *Terebra benthalis* Dall, West Indies.

Section Perirhoë Dall.

Like Strioterebrum, but with the axial sculpture obsolete or absent and the spiral emphasized. Type *Terebra circumcincta* Deshayes. *Acus rushii* Dall is an American species.

Section Triplostephanus Dall.

Shell many whorled, slender, the whorls medially constricted, the sculpture uniform, the whorls with one or two nodulous bands in front of the suture, and a third angulating the base of the whorl, the spiral sculpture predominant, the axial (except the nodules) feeble, the body callous, with a raised inner lip. Type *Terebra triseriata* Gray.

This group was included by Hinds in the original Myurella, but the type of the latter has the young and old with discrepant sculpture, the later whorls having the reticulation of Strioterebrum, which has therefore usually been included in Myurella. It also has no basal keel and the whorl is not constricted. Both Triplostephanus and Myurella, like the great majority of the family, have only a single marginal keel on the anterior edge of the pillar.

Subgenus (and section) Terebra s. s.

Young with the sculpture of Triplostephanus. Shell slender with many whorls, the inner lip not callous, the sulcus and sutural band obsolete or absent, and the surface of the whorls smooth in the adult. Type *T. subulata* (L.) Lamarck.

Section Myurella Hinds, 1844.

Young with double nodulous band and strong sulcus in front of the suture, shell many whorled, the whorls not constricted, in the adult the nodules obsolete and the band and sculpture as in Strioterebrum, inner lip callous and elevated. Type *Terebra myuros* Lamarck.

See remarks under preceding section. The sulcus is persistent in the adult, though the character of the band alters.

Section Subula Schumacher, 1817.

Young with presutural sulcus and band, band and body regularly axially ribbed, the whorl not constricted. Adult shell with many slender whorls, smooth, but with the sulcus persistent; inner lip not callous, other features as in Terebra. Type *Terebra dimidiata* (Linné).

This is the second section of *Schumacher's* Subula to which the name was restricted by Gray, in 1847.

Section Abretia H. and A. Adams, 1853.

Shell small, sculpture uniform, but in the later whorls more or less obsolete, sulcus persistent, whorls axially evenly ribbed, not constricted; young acute, adult subcylindric; columellar lip callous: the posterior angle of the aperture compressed into a sort of channel. Type *Terebra cerithina* Lamarck.

Section Oxymeris Dall, 1900.

Shell large, heavy, acute, the later whorls rapidly enlarging; the young as in Subula, the sulcus not persistent in the adult, which has the later whorls smooth. Type *Terebra maculata* Lamarck.

This is Acus Gray, 1847, not of Edwards, 1771.

Subgenus (and section) Acuminia Dall.

Young with flat axially regularly ribbed whorls, blunt at the suture without sutural band or sulcus, shell slender, many whorled, the adult smooth, the columellar lip bare, with no canal, but a deep siphonal sulcus. Type *Terebra lanceata* (Linné).

This section of Subula is remarkable for the total absence of the presutural sulcus.

HASTULA Adams.

Subgenus Hastula H. and A. Adams, 1853.

Shell small and slender, the sculpture similar in young and old; no presutural band or sulcus, no canal, suture appressed, sculpture of fine axial wrinkles and feeble spiral striae, whorls flattish, spire acute, columellar lip with a thin callus, the posterior angle of the aperture channelled; colors usually dark and lurid. Type *Terebra strigillata* Lamarck.

This is a widely distributed group of peculiar sculpture and coloration, represented by closely similar species in nearly all the tropical seas.

Subgenus Impages Smith, 1873.

Shell larger with whorls flat and rapidly enlarging; sculpture of young and old discrepant. Young, faintly axially ribbed, the suture appressed, with no sulcus or band; the adult smooth, a thin wash of callus on the body, extending over the whorl behind the line of the following suture; inner lip not raised, the aperture with no posterior channel or anterior canal, but a deep siphonal sulcus, the pillar with one more or less hidden keel. Type *Terebra coerulescens* Lamarck.

The band of enamel behind the suture is not very conspicuous and may not be of much systematic value; the other characters, however, seem to give it a certain value.

DUPLICARIA Dall.

Duplicaria Dall, Nautilus, March, 1908, p. 124.

Shell small, acute, similarly sculptured throughout, with sharp, regular, numerous axial ribs crossing the flat whorls and divided by a conspicuous spiral sulcus; suture distinctly channelled; pillar with a single keel, the columellar lip not callous or raised, the canal obsolete, the aperture with no posterior channel. Type *Terebra duplicata* Lamarck.

This is Myurella Troschel, not Hinds. The anatomical characters have already been mentioned and forbid its consolidation with the other genera. It is the only group in the family with a channelled suture.

SPINEOTEREBRA Sacco.

Subgenus Spineoterebra Sacco, 1801, s. s.

Shell rather elongate, with knobby axial sculpture, no spiral sculpture, an impervious axis, and a markedly callous pillar lip. Type *Terebra spinulosa* Doderlein, Tortonian. The siphonal fasciole is nearly obsolete.

Subgenus Mazatlania Dall, 1900.

Shell shorter, buccinoid, thin, with sparse knobbed axial ribbing, spiral sculpture conspicuous toward the canal; the pillar gyrate, the axis pervious, the pillar lip bare, the siphonal fasciole well developed. Type *Terebra aciculata* Lamarck.

Mazatlania is Euryta Adams, 1853, not of Gistel, 1848. It appears to be a descendant of Spineoterebra, which is intermediate between Strioterebrum and Mazatlania. The soft parts of both are unknown.

Terebra (Strioterebrum) panamensis Dall, n. sp.

Plate 5, figure 10.

Shell small, acute, twelve-whorled, with rather prominent sculpture and a generally brownish tint; nucleus eroded in all the specimens; subsequent whorls nearly uniformly sculptured with (on the penultimate whorl 17) sharp, narrow, equal and equidistant, slightly retractive axial ribs, separated by wider shallow interspaces, crossed by (between the sutures 3–5) spiral cords which become slightly nodulous at the intersections; the spirals are uniformly spaced except at the summit, where there are two closely adjacent which may unite as a presutural band, or remain divided like the others; at the periphery of the base is a narrower cord separated from those behind by a wider space; the suture is coiled on this keel, while the space behind it gives the effect of a channelled suture; on the base the ribs extend toward the canal, the spirals are smaller than those between the sutures, and about seven in number, but owing to the obsolescence of the ribs they are not tuberculate and form no distinct reticulations; the base is constricted above the siphonal fasciole, which is sometimes bordered by a keel, which on the adult pillar is lost in the thick callus; canal short, wide, recurved; outer lip thin, throat not lirate. Lon., 22; max. diam., 6 mm.

U. S. S. "Albatross," station 3291, Gulf of Panama, in 153 fathoms, mud, bottom temperature 55°.8 F. U. S. N. Mus., 123,084.

Also at station 2834, in 48 fathoms, mud, off the west coast of Lower California, in latitude 26° 14′ N. near Ballenas Bay, bottom temperature 53°.9.

The reticulation of this species is so close and strong that the sutural band is rendered quite inconspicuous.

Terebra (Strioterebrum) pedroana Dall, n. sp.

Shell small, slender, acute, apex (slightly decollate); subsequent whorls flattened, about eleven in number, the sutural band, on the early whorls, axially undulate by the prolongations of the ribs across the feeble sulcus to the suture; axial sculpture of numerous, nearly vertical, low, narrow riblets with wider interspaces, proportionately less marked on the last whorl; these are crossed without nodulation by three obscure flattish spiral bands, with one or two narrower and more thread-like, and on the base of the last whorl six or seven more feeble spirals of the same sort, all with narrower feebly channelled interspaces; aperture narrow behind a thin callus and anterior keel on the pillar; outer lip thin, sharp; canal very short, recurved, bordered by a prominent sharp keel on the posterior edge of the siphonal fasciole, hardly visible on the pillar but perceptible within the whorls; color bluish white with irregular blotches of yellowish brown, or all brownish. Lon. of (decollate) shell, 32; of last whorl, 12; of aperture, 8; max. diam., 6.5 mm.

U. S. Nat. Museum 118,806 and 32,772, both from San Pedro, California, Stearns and Mrs. Burton Williamson.

This species, which had been regarded as a variety of *T. plicata* Gray, resembles that species but is smaller and more slender. The specimens had been in the collection many years. Further search will doubtless show it to be extended southward in its geographical range.

Terebra (Strioterebrum) balaenorum Dall, n. sp.

Shell small, slender, acute, whitish flesh-color, with occasional brown flecks, or all pale brown, with about fifteen whorls, of which the apical three are glassy, smooth, and brownish; subsequent whorls flattish, with a well-marked nodulous presutural band and impressed sulcus; the nodules are subrectangular, corresponding to the axial ribs, which are feeble, moderately retractively arcuate and about seventeen in number on the penultimate whorl; in front of the band are six or seven flattish straplike or threadlike spiral little-elevated ridges, irregular in width with narrower interspaces and obscure very fine spiral striation visible on top of the ridges here and there, the base being similarly sculptured with rather narrower ridges; all the ridges are slightly nodulous or wavy when interrupted by the ribs; aperture elongate, lozenge-shaped, the outer lip thin, inner lip polished but not callous, pillar hardly keeled; canal reduced to a notch, siphonal fasciole with a sharp posterior keel. Lon. of shell, 27.0; of last whorl, 10.5; of aperture, 7.0; max. diam., 6.0 mm.

U. S. S. "Albatross," station 2835, off Ballenas Bay, west coast of Lower California, in five and a half fathoms, mud. U. S. N. Mus. 110,599; also at La Paz, Gulf of California, by W. J. Fisher.

This species is somewhat like Reeve's figure of *Terebra serotina* Adams and Reeve, from Japan, which, however, is a larger species, has a double band of nodules and a callous inner lip.

Terebra (Strioterebrum) lucana, Dall, n. sp.

Shell small, straw-colored, acute, with about fourteen whorls, the apex blunt and slightly swollen and, with the following whorl, glassy, smooth, and polished; subsequent whorls flat, regularly increasing, with a rather wide, closely vertically ribbed presutural band, which is also closely spirally evenly threaded with about five threads; the sulcus is marked by a series of rather deep punctations between the raised axial sculpture; body of the penultimate whorl with about thirty-two similar narrow, low, nearly vertical, wave-like ribs which are also prolonged across the band and are separated by rather wider interspaces; these are crossed between the sulcus and the next preceding suture by about a dozen even, nearly uniform and uniformly spaced spiral threads with narrower interspaces which have an almost punctate appearance from the fine reticulation; similar threads and the anterior prolongations of the ribs cover the base; aperture narrow, rather long; outer lip simple, inner lip slightly glazed; pillar with two distinct rounded plaits; canal distinct; fasciole lamellose with a strong posterior keel. Lon. of shell, 36; of last whorl, 14; of aperture, 9; max. diam., 7 mm.

U. S. S. "Albatross," station 2830, west of the southern extreme of Lower California, in 66 fathoms, sand, bottom temperature 74° F. U. S. N. Mus. 96,567.

This species is nearest to *T. hindsii* Deshayes (not Carpenter) from China, but is more regularly conical and acute, the whorls flatter with a relatively wider sutural band which is much less prominent. The *T. hindsii* of Carpenter was published earlier than the species of the same name described by Deshayes and the latter was later re-named *T. bruguièri* by Reeve.

Terebra (Strioterebrum) bridgesi Dall, n. sp.

Shell very small, livid purple, with a white peripheral broad band and the more prominent portions of the axial sculpture more or less whitish; with about three smooth coniform glassy nepionic whorls, and nine or more subsequent sculptured whorls; penultimate whorl with about twelve strong, short, rounded, whitish ribs which have wider interspaces and become obsolete at the periphery of the shell; the sutural band is very distinct, set off by a strongly constricted sulcus, while the whorl in front is rounded and more prominent than the band; the latter is similarly ribbed, but the ends of the ribs on the body of the whorl meet the band at the interspaces between the ribs on the band so that the two alternate; the interspaces on the band show about three, and the rest of the whorl between the sulcus and the suture about five or six sharply incised grooves which do not cross the ribs; the base is similarly sculptured with rather distant grooves; aperture ample, outer lip thin, sharp, inner lip bare, canal reduced to a wide, short sulcus, the fasciole obscure, the pillar with one obscure plait. Lon. of shell, 10.5; of last whorl, 4.0; of aperture, 2.5; max. diam., 2.5 mm.

Panama, Bridges. U. S. N. Mus. 9404.

This is a remarkably distinct and peculiar little species, very uniform in color and sculpture, which was collected at Panama by the late Thomas Bridges and acquired by the Museum with the Stearns Collection.

Terebra (Perirhoë?) stylus Dall, n. sp.

Shell with the extreme tip defective but having about sixteen subsequent whorls remaining, of a uniform pale yellowish brown, not far from straw color; axial sculpture only of sigmoid incremental lines; spiral sculpture consisting of a moderately prominent presutural band, divided by an incised line at its anterior third, giving somewhat the effect of a double band; in front of this are about seven fine spiral threads with narrower interspaces; on the last whorl these threads appear uneven, some being stouter than others; the periphery is obscurely subangular, the base finely spirally closely threaded; these spiral threads are hardly visible without a lens; aperture semilunate, short, a glaze on the body and pillar; canal very short, constricted, and recurved, a keel behind the fasciole not continued on the pillar. Lon. of shell, 29; of last whorl, 7: of aperture, 4; max. diam., 5 mm.

Panama Bay, Stearns, U. S. N. Mus. 32,773.

This species approaches *T. laevigata* Gray, but has longer whorls and a less prominent and conspicuous presutural band.

Terebra (Subula) lingualis Hinds.

Terebra lingualis Hinds, Proc. Zoöl. Soc. London, 1843, p. 153; Thes. Conch., 1844, **1**, pt. 11, p. 167, pl. **43**, fig. 50; Reeve, Conch. Icon., 1860, **12**, Mon. Terebra, pl. **5**, fig. 15.

Terebra insignis Deshayes, Journ. de Conchyl., 1857, **6**, p. 70, pl. **3**, fig. 2.

Terebra robusta (*pars*) Tryon, Man. Conch., 1885, **7**, p. 11, pl. **2**, fig. 17; not of Hinds, 1843.

U. S. S. "Albatross," station 3354, one dead and broken specimen, Gulf of Panama, in 322 fathoms, mud, bottom temperature 46° F. U. S. N. Mus. 123,083. Probably disgorged by a fish. Gulf of Papagayo and Bay of Montijo, west coast of the State of Panama, Middle America, in ten to seventeen fathoms, sandy mud, Cuming.

It is not likely that this well-known species lived at a depth of 322 fathoms. It was dredged in Panama Bay at two localities in 33 fathoms, bottom temperature 64°F., off Guaymas in 20 fathoms, and near the head of the Gulf of California, in 33 fathoms, mud. Other localities represented in the National Museum are: Cape St. Lucas, Puerto Libertad, and Real Llejos. It had also been reported from the last mentioned locality by Mörch.

Conidae.

CONUS Linné.

Conus gradatus Mawe.

Conus gradatus Mawe, Conch., 1823, p. 90; Wood, Suppl. Ind. Test., Conus, 1828, fig. 6.

U. S. S. "Albatross," station 3368, in 66 fathoms, rocky bottom, near Cocos Island, Gulf of Panama; one dead specimen, verging toward the variety *regularis* Sowerby. The species ranges from the Gulf of California to Panama.

Conus ? sieboldi Reeve.

Conus ? sieboldi Reeve, Conch. Icon., 1848, **1**, *Conus*, fig. 269; Sowerby, Thes. Conch., 1857, **3**, p. 13, pl. **202**, fig. 369.

U. S. S. "Albatross," station 4642, four miles off Hood Island, Galapagos Ids., in 300 fathoms.

A broken fragment, agreeing very well with Sowerby's figure of this species, was obtained as above, U. S. N. Mus. 110,614. It was originally described from Japan, and better material may in future show the Galapagos shell to be distinct.

Turritidae.

TURRIS Bolten.

Turris Rumphius, Amboynische Rariteitkammer, 1704; Argenville, Conchyliologie, 1757; Chemnitz, Conchylien Cabinet, 1780 (nomenclature prelinnean).
Murex (sp.) Linné, Syst. Nat., 1758, ed. 10, p. 753; 1767, Ed. 12, p. 1220.
Fusus (*ex parte*) Helbling, Abhandl. ein. privatges. in Boehmen, 1779, **4**, p. 116; not of Lamarck, 1799.
Turris (Anonymous) in Mus. Calonnianum, 1797, p. 34, 82; nude name including *T. babylonius.*
Turris Bolten, Mus. Boltenianum, 1798, p. 123; 1st species *Murex babylonius* Linné, after *Turris babylonica* of Rumphius.
Pleurotoma Lamarck, Prodrome, 1799, p. 73; sole ex. *Murex babylonius* Linné.
Turris Gray, P. Z. S. 1847, p. 134, type *T. babylonius* (Linné); H. and A. Adams, Gen. Rec. Moll., 1853, **1**, p. 87; Weinkauff, Jahrb. Mal. Ges., 1875, p. 285; Martini-Chemnitz, Conch. Cab. Zweite Ausg., 1876, **4**, pt. 3, *Pleurotomacea* p. 5; Gabb, Journ. Acad. Nat. Sci. Phila., 1860, 2d ser., **4**, p. 378; Dall, Journ. Conch. (Leeds), April, 1906, **11**, p. 291; not *Turris* Montfort, 1810, nor *Turris* Lesson, 1837.

The name Turris was originally proposed by Rumphius in 1704 for the shell afterward called *Murex babylonius* by Linné. He was followed by other non-binomial writers, such as Argenville and Chemnitz. The first binomial use of the name was in the anonymous Museum Calonnianum, but the names of both genus and species listed under it are absolutely "nude." The only way of knowing what the author of the list meant is by a manuscript note of Humphrey which was inserted in copies sold by him. Turris "Humphrey" is erroneously stated by Herrmannsen and Cossmann to have been equivalent to Turritella, which is called Terebra in the Museum Calonnianum.

In the following year the publication of Bolten's catalogue introduced Turris in the sense originated by Rumphius nearly a century before and with the same type included.

In this Bolten was followed by Fabricius in 1822,[1] Gray in 1847, and H. and A. Adams in 1853. No other course is consistent with the rules of nomenclature, as is shown by the writer in an impending publication on the Miocene Fossils of Oregon.

A year after the issue of Bolten's catalogue Lamarck, disregarding a century of usage and tradition, proposed the name Pleurotoma for this group, which has generally been adopted, owing to the wider circulation of Lamarck's Animaux sans Vertebres, and the influence of the French school, at that time the most brilliant workers in Conchology of the whole world.

It is with regret that we are obliged to discard a familiar name, but there seems to be no alternative open to the impartial student.

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[1] Fortegnelser, p. 83. This is stated on the authority of Herrmannsen, as the writer has not been able to consult this work.

This family probably contains more species than any other group of Gastropods of the same rank. Their variations are such that subdivision is imperatively necessary, and numerous generic and subgeneric names have been applied to both recent and fossil groups. The work has been done in a more or less superficial manner, and the result is that the nomenclature of the group stands in great need of revision by some one who will go into the matter with thoroughness, patience, and care. I have felt unable at present to give the time needed, and therefore feel obliged to state that the subdivisions adopted in this memoir are but provisionally and tentatively used. The final systematic arrangement of the family cannot be had until the anatomy and dentition are better known. There is little doubt, however, that the subdivisions will prove fully as numerous as they are at present, though many of the old ones will have to be rejected for various reasons.

At present the most convenient way of dividing the family seems to be by separating the two groups of operculate and inoperculate species as subfamilies *Turritinae* and *Mangiliinae* respectively.

The following groups are recognizable among the species of *Turritinae* treated of in this memoir:

Turris s. s., large fusiform strongly sculptured shells, with a long spire, a long straight canal, the outer lip not thickened or reflected, the anal sulcus not close to the suture, and the operculum claw-shaped or narrowly oval, with an apical nucleus.

Surcula H. and A. Adams, 1853 (*Surgula* Weinkauff, 1876). Shells similar, but with the body more robust, the canal shorter and often more or less curved, the sinus close to the suture. Type *Murex javanus* Linné.

Drillia Gray, 1838. Shells relatively smaller, solid, mostly strongly sculptured, with a conspicuous sulcus anteriorly and another near the suture in a thickened and produced outer lip; a callous inner lip and short canal. Type *D. umbilicata* Gray.

Gemmula Weinkauf, 1876. Shell resembling Drillia, but with a thin and simple outer lip without an anterior sulcus, and the pillar lip usually simple, hardly callous, the sculpture most emphasized in a spiral direction, often with a prominent beaded keel at or in front of the anal fasciole. Type *Pleurotoma gemmata* Hinds. Hemipleurotoma Cossmann, 1889, is believed to be synonymous.

Pseudotoma Bellardi, 1875. Shell ovate, fusiform, short, stout; spire about the length of the aperture, columella straight, very short, axis impervious, canal very short and wide; anal sulcus wide, moderately deep, close to the suture; spiral sculpture feeble, axial of moderately strong riblets; operculum wide, ovate, with apical nucleus. Type *Pleurotoma intorta* Brocchi.

Leucosyrinx Dall, 1889. Shell moderately large, thin, white, or pale, with impervious axis, the sculpture chiefly of delicate spiral threading with feeble axial riblets at the shoulder; anal fasciole wide, shallow, next the suture; canal moderately long, distally flaring; the pillar thick, anteriorly obliquely truncate; operculum subovate, acute in front, with a medial thickened rib on the inner face, the area of attachment small, the nucleus apical. Type *Pleurotoma verrilli* Dall.

This group is chiefly Atlantic in its distribution, and as at first used comprised some species which I now separate as follows:

Irenosyrinx Dall, nov., 1908. Shell large, thin, fusiform white, with a keel at the shoulder; sculpture feeble, wholly spiral; anal sulcus wide, shallow, nearer the shoulder than the suture; axis pervious, aperture and canal longer than the spire; outer lip produced, thin, simple; canal elongate, pillar obliquely truncate; operculum in the young paucispiral, later the paucispiral nucleus is surrounded by concentric additions, leaving the nucleus subcentral, or a little anterior and to the right, in an elliptical concentric operculum without internal rib, with a large area of adhesion, and an outline in general like the operculum of Buccinum. Type *Pleurotoma* (*Leucosyrinx*) *goodei* Dall.

This group seems rather characteristic of the eastern Pacific, usually in rather deep water. The *Turris* (*Aforia*) *circinata* Dall, from the North Pacific, has much the same type of shell, though of a brown color, but has the operculum narrow with an apical nucleus, and, in the adult, a prominent and singular channel in the anterior part of the outer lip. Irenosyrinx is doubtless a modification of the type Steiraxis, in which the operculum remains permanently paucispiral.

Cochlespira Conrad, 1865. Shell moderate in size, with a subacute, few whorled, glassy nucleus, elongated slender, straight canal, the whorls tabulated by a sharp recurved spinose or beaded keel, between which and the suture the surface is concave, nearly smooth; anal sulcus deep, narrow, the fasciole separated from the suture by a beaded ridge, the outer margin of the fasciole not elevated. Type *Pleurotoma cristata* Conrad. Oligocene fossil.

This group is extremely close to Ancistrosyrinx Dall, 1881, the latter differing only by having the anal sulcus at the suture, with no intervening ridge, while the outer margin of the fasciole has an elevated lamella between which and the reflected keel at the shoulder there is an excavated channel. These differences hold good between the Oligocene and the recent forms, so far known, without exception. The recent forms have an operculum like that of Leucosyrinx.

Steiraxis Dall, 1895. Shell resembling Irenosyrinx, but with stronger sculpture and with a paucispiral operculum, bearing such a relation to the normal species of Turris as Mohnia bears to Chrysodomus.

Calliotectum Dall, 1889. Shell with a dark vernicose periostracum, no differentiated canal, anal sulcus or fasciole; axially ribbed, pillar thin, twisted; axis impervious; outer lip simple, arcuate, thin, not internally lirate; operculum like that of Fusinus, but arcuate; animal blind, without radula or poison gland. Type *C. vernicosum* Dall.

By a misplacement of a sheet of the MS., not detected at the time, this group appeared in the original publication as a subdivision of Mangilia instead of Pleurotoma.

In the Mangiliinae the following groups have species referred to in this paper:

BORSONIA Bellardi, 1838. Shell fusiform, with spiral and axial sculpture, the anal sulcus close to the suture, wide and shallow; the canal elongated, the pillar with a single plait (or, according to Cossmann, in the type species two) on the proximal part of the pillar. Type *B. prima* Bellardi.

The abyssal and Pacific Coast species are sufficiently different and numerous to stand as a distinct group from that containing the Italian fossils, as follows:

BORSONELLA Dall, nov., 1908. Shell with a small, blunt nucleus of one or two whorls, sculpture chiefly spiral, feeble, except for one or two spiral carinae, sometimes with a few small riblets or beads on the principal carina; periostracum conspicuous, smooth or vermiculate; canal wide and very short; outer lip sharp, simple, arcuate; pillar solid, with one strong, nearly horizontal plait continuous upon the whole axis; axis impervious, operculum absent. Type *Borsonia dalli* Arnold.

There is never more than one plait in Borsonella; in Cordieria, as restricted by Cossmann, there are never less than two. In Rouaultia the anal sulcus is narrow, sharp, and situated at the shoulder in the peripheral carina. Both Cordieria and typical Borsonia have a long and slender canal and the general aspect of Gemmula, while Borsonella resembles an Antiplanes with a strong plait on the proximal part of the pillar.

GYMNOBELA Verrill, 1884. Shell ample, stout, smaller than the average Pleurotomella, with a short spire and no operculum. Type *G. curta* Verrill.

These shells occupy, so far as the shell characters are concerned, a place in the Mangiliinae analogous to that which is assigned to Bela among the operculate forms.

PLEUROTOMELLA Verrill, 1873. Shell with a small blunt nucleus of several whorls, closely arcuately axially ribbed, the succeeding whorls with axial and spiral sculpture, short-fusiform; the anal sulcus close to the suture, deep and wide, with a distinct fasciole; canal very short, narrow, recurved; outer lip thin, simple, sharp; pillar thin, gyrate, anteriorly obliquely truncate, almost pervious. Animal blind, inoperculate. Type *P. packardii* Verrill.

The original type was a small, very delicate shell, but species subsequently added to the group attain a notable size and solidity.

PHYMORHYNCHUS Dall, 1908, nov. Shell thin, smooth, or spirally sculptured, axial sculpture less conspicuous; fusiform, canal nearly obsolete, pillar and outer lip simple; sulcus wide, shallow, close to the suture; animal blind, with a distinct muzzle into which the proboscis is retracted, operculum wanting. Type *Pleurotomella castanea* Dall.

The average Pleurotomoid gastropod, as far as indicated by the animals figured and those examined by the writer, has a simple orifice under and covered by the head and expanded tentacular bases; in the species of the present section a projecting flat-ended muzzle exists, which permanently extends beyond the line joining the tentacles, and into an aperture in the end of which the proboscis is retracted. The three species known to possess this character have therefore been thought worthy of a special name.

MANGILIA Risso, 1826. Shell small, with an elevated spire, feeble spiral and more emphatic axial sculpture; aperture elongate, outer lip thin, entire, simple; anal sulcus obscure; animal inoperculate. Type *M. costulata* Risso = *Murex nebula* Montagu.

Risso named no type, and his species are heterogeneous, as were those of Leach published a quarter of a century later. *M. striolata* Risso, suggested as type by Gray in 1847, cannot be accepted in that character, as it does not agree with the generic diagnosis, being a Clathurella. By taking the first species as type, which also agrees, not only with the diagnosis but with the majority of the species mentioned by Risso, we come to a result harmonious with the practice of the majority of authors who have treated of the genus. This will exclude from the group a few species of Cythara and Clathurella unwisely included in Risso's original list. Since the name of the author intended to be honored was Mangili, we accept the correction proposed by Philippi to the Mangelia of Leach and Risso.

CLATHURELLA Carpenter, 1856. Shell small, short-fusiform, with spiral and axial sculpture, usually pronounced; the last whorl large, with a very short canal; outer lip varicose, the margin in the adult projecting as a thin lamina somewhat beyond the varix; anal sulcus strong, not deep, close to but not at the suture, the narrow bit of the outer lip behind the sulcus projected sometimes upon the body of the inner lip as a dentiform or nodulous morsel of callus; except this the body and columella bare, free from callus or lirae or denticulation; canal narrow, slightly recurved; suture distinct, spire rather acute, operculum wanting. Type *Defrancia pagoda* Millet; Tertiary fossil, 1825, not *Pleurotoma pagoda* Reeve, 1845.

The genus Defrancia was proposed by Millet in a paper printed in the early part of 1827, and in the course of that year it was adopted by Des Moulins and shortly after by several other authors. It was soon pointed out that the name was preoccupied in Polyzoa by Brown, and Philip Carpenter in 1856 proposed for Defrancia Millet, *non* Brown, the new name of Clathurella, on the ground that the former name is preoccupied. Carpenter named no type, and therefore those who concern themselves with the genus must accept as the type of Clathurella the type of the original Defrancia Millet. Millet himself named no type, though his species seem all congeneric.

Lovén, who adopted Defrancia in 1846, referred to it the recent *Pleurotoma linearis*, which, although a member of the genus, was not included in Millet's list. Notwithstanding this it has been generally cited as the type of the genus following Gray's mention of it in 1847. The only species mentioned by Millet which is averred to be found living is his *D. suturalis*. This is stated by several authors to be identical with *Pleurotoma gracilis* Philippi (= *emarginata* Donovan) which has served as the type for the groups Bellardia Bucquoy, Dollfus and Dautzenberg, 1882, not of Mayer, 1870; Comarmondia Monterosato, 1884, and Bellardiella Fischer, 1883; and also includes a large number of Bellardi's species of Homotoma according to Cossmann, who makes the group under the name of Bellardiella a subgenus of Daphnella which he thinks has a similar nucleus. It is curious that, while the figure of the nucleus given by M. Cossmann (that of *Murex textilis* Brocchi) correctly illustrates the nucleus of Daphnella, the nucleus of *Bellardiella gracilis* is entirely different. It is irregularly coiled and swollen, without sculpture, except for the punctations which are a feature of the whole surface of this species, and on the last whorl, which assumes a strong peripheral carina before the mature sculpture begins to be developed. The nucleus of Daphnella, on the other hand, is a typical "*Sinusigera.*" So it would seem as if *Bellardiella* (*gracilis*), whether it agrees with the typical form of Defrancia (= Clathurella) or not, can at least not be united with Daphnella on account of a similarity of its nuclear characters.

As three of Millet's five species are the victims of a more or less complicated and possibly doubtful synonymy, and no type was mentioned in the original publication, it is best to take as type one of those which seem free from uncertainty, and preferably his largest and first species, *Defrancia pagoda* (pl. 9, fig. 1). It should not be forgotten, however, that Millet himself points out that the subsutural callus mentioned in his diagnosis is not invariably present. As Clathurella takes the type of Defrancia, the species just mentioned will serve the substituted generic name in the same capacity.

GLYPHOSTOMA Gabb, 1872. Shell small, fusiform, elegantly and profusely sculptured; aperture varicose, columellar lip lirate or denticulate, the outer lip similarly ornamented; sinus deep and conspicuous, canal moderately produced and recurved, operculum absent; nucleus conic, of a few polished unicarinate whorls. Type *G. dentifera* Gabb.

This group is related to Clathurella, from which it differs by the dentate or lirate pillar lip in the adult, and the very conspicuous anal sulcus. The species assigned to it have a common facies which cannot be mistaken when once recognized, and having usually a brilliant surface polish, are among the most elegant of small gastropods. The suture is less constricted and the whorls less rounded than in Clathurella.

EUBELA Dall, 1889. Shell small, thin, glossy, polished, the outer lip sharp, simple, arcuate; pillar and inner lip simple, canal inconspicuous, reduced to a mere angle as in Trichotropis, operculum wanting, nucleus of the *Sinusigera* type; anal sulcus at the suture, very inconspicuous and shallow. Type *Daphnella* (*Eubela*) *limacina* Dall.

The typical species has a pretty garland of nodules in front of the suture but this proves to be merely a specific character.

SURCULINA Dall, 1908, *nov.* Shell of moderate or small size, slender, elongate-fusiform, the earlier whorls feebly ribbed or axially sculptured, the later ones with fine even spiral sculpture; spire acute, suture appressed, aperture long and narrow; both lips perfectly simple; pillar straight, outer lip gently arcuate, anal sinus obsolescent at the suture; canal rather wide, long; operculum wanting. Nucleus eroded. Type *S. blanda* Dall.

The characteristic sculpture and form of these little shells is very notable. They resemble in miniature Irenosyrinx without the operculum or carinae. If one may be permitted to judge from a figure only, the *Homotoma producta* Bellardi, should belong to it.

CLINURA Bellardi, 1875. Shell solid, short, biconic, the whorls strongly carinate at the periphery and flattened toward the suture; anal sulcus wide and deep, close to the suture; canal short and recurved; axial sculpture inconspicuous, operculum absent. Type *Pleurotoma calliope* Brocchi.

This section is convenient for holding a few species with very marked form which, if rounded instead of carinate and with a less constricted suture, might easily find a place with Gymnobela.

BELLARDIELLA Fischer, 1883 (*Bellardia* B. D. and D., 1882). Shell small, fusiform, with axial and subequal spiral sculpture; nucleus having the exposed part with a trochoid aspect, and carrying the *Sinusigera* sculpture; subsequent whorls rounded, with very distinct suture; anal sulcus at the suture, rather deep, leaving an inconspicuous fasciole; outer lip thin, simple, sharp, much produced in arcuate form; pillar simple, obliquely truncate in front, twisted, impervious; animal inoperculate. Type *Murex gracilis* Montagu.

It is particularly called to the reader's attention that the above groups are accepted tentatively for the purpose of this paper and that, in so accepting them, subject to future revision, no attempt at a new classification or arrangement of this family is intended.

Turris (Surcula) fusinella DALL, n. sp.

Plate 14, figure 7.

Shell small, slender, delicate, white with a faint suffusion toward the periphery of pale pinkish, with ten or more whorls; spire acute, a little shorter than the aperture; nucleus of three elevated whorls milk-white, glassy, smooth, abruptly changing to the adult type of sculpture; fifth whorl with seven, ninth with ten, short axial ribs, chiefly visible on the periphery, crossed by two strong spiral cords, more or less turgid at the intersections; the whorl above these cords is somewhat excavated with a nearly smooth surface except for lines of growth and three or four spiral threads, more distinct and numerous on the later whorls; base bordered by a prominent cord on which the suture is laid, giving the effect of a presutural ridge just behind the anal fasciole; on the base are about 20 more cords with a tendency to alternate in size; the whole surface has minute spiral striae and lines of growth which form a microscopic reticulation only visible with a good lens; aperture rounded, canal long, slender; body polished and the sculpture eroded; pillar white, callous, obliquely truncate in front, slightly twisted, not pervious; outer lip thin, simple; anal sulcus wide, shallow. Lon. of shell, 17; of aperture, 9; max. diam. 5 mm.

U. S. S. "Albatross," station 3391, in the Gulf of Panama, in 153 fathoms, mud, bottom temperature 55°.8 F. U. S. N. Mus. 123,086. Also at station 3017, off Cape Lobos, Gulf of California, west coast of Mexico, in 58 fathoms, mud, bottom temperature 61°. 8 F. U. S. N. Mus. 110,600.

This species has very much the look of a small Fusinus of the typical group.

Turris (Surcula) dolenta Dall, n. sp.

Shell elongate, acutely fusiform, white, with nine rather rounded whorls following the (lost) nucleus; general aspect recalling the preceding species but larger, with a proportionately more swollen body whorl; fifth whorl with nine, ninth with nine short protractive axial ribs confined to the shoulder and periphery; the whorls are covered with spiral threads of which two marginating the suture and two on the periphery are more conspicuous than the rest, but not perceptibly nodulous; between the peripheral cords there are, on the later whorls, from two to four minor threads; on the base of the last whorl there are six or seven major, as many intermediate, and about a dozen minor threads; the suture is very closely appressed and the anal fasciole nearly free from axial and with only very fine spiral threads; anal sulcus wide and deep beginning at the suture; outer lip thin, much produced, roundly arcuate to the somewhat constricted base of the whorl; aperture, including the canal, as long as the spire; pillar smooth, white, not callous; obliquely attenuated in front, the canal ample; flaring a little in front; axis impervious; the back of the canal closely spirally threaded; length of shell, 36.5; of aperture, 19.25; max. diam. of last whorl, 13.0 mm.

U. S. S. "Albatross," station 2804, in Panama Bay, in 47 fathoms, mud; U. S. N. Mus. 96,645 (type) and station 3389, Gulf of Panama, in 200 fathoms, mud, bottom temperature 48°.8 F.

With extremely similar sculpture this differs from *T. fusinella* in size and in the proportions of the whorls, which are also of a dull white surface, while *T. fusinella* is polished and shows indications of a color band which in some specimens may be well marked.

Turris (Surcula) armilda Dall, n. sp.

Shell small, delicate, fleshy white, obscurely banded with brown, a pale belt on the last whorl just in front of the periphery; whorls eight excluding the (lost) nucleus; spire acute, slightly shorter than the aperture including the canal; whorls with a conspicuous shoulder, above which a slightly concave spirally striate anal fasciole extends to the appressed suture, which on the last whorl or two shows indications of a marginal thickening; axial sculpture of (on the last whorl, about fifteen) protractive short riblets with subequal or slightly shorter interspaces apparently confined to the periphery: these are crossed by two strong spiral threads, the posterior largest and forming oblong tumid nodules at the intersections; the anterior thread is also but less conspicuously nodulous or undulated; the rest of the surface is covered with fine spiral threads, of which there are three between the two large ones above mentioned; the base of the last whorl has fourteen coarse spiral threads with one to three finer intercalary threads; anal sulcus very deep and wide; outer lip thin, sharp, much produced; pillar smooth, twisted, obliquely attenuated in front with an impervious axis; canal long, moderately narrow, slightly recurved. Lon. of shell, 29.0; of aperture, 15.5; max. diam. 9 mm.

U. S. S. "Albatross," station 3017, Gulf of California, off Cape Lobos, in 58 fathoms, mud, bottom temperature 51°.8 F. U. S. N. Mus. 110,601.

This species belongs to the group of *T. fusinella*, from which it differs by the obliquity of the ribs and the disparity in size between the peripheral spiral cords, which are quite equal and equally nodulous in *fusinella*.

Turris (Surcula) notilla Dall, n. sp.

Shell small, solid, fusiform, the spire acute and slightly longer than the aperture; whorls ten, beside the (lost) nucleus, covered with a conspicuous olivaceous periostracum; suture appressed, with a strong spiral cord between it and the somewhat excavated anal fasciole which is sculptured by several sharp spiral incised lines; from the shoulder extend about eighteen slightly protractive axial rounded riblets, stoutest at the shoulder, diminishing forward, and extending nearly to the canal, with narrower interspaces; these are crossed by about eighteen larger spiral cords on the last whorl, seven of which are on the body of the whorl and the rest on the beak and canal; the former are turgid where they cross the ribs, and in the interspaces have one to three much finer threads; the latter are more or less undulate, but have hardly any or no spiral secondary threads; anal sulcus, shallow and wide; aperture rather narrow, outer lip produced, thin, simple; pillar lip smooth, whitish; pillar straight, obliquely attenuated in front; canal rather short and wide. Lon. of shell, 26; of aperture and canal, 12; max. diam., 9 mm.

Found with the last-mentioned species. U. S. N. Mus. 110,602.

This and the following species show characters connecting them with Drillia, especially such species as *D. alesidota* Dall, and *D. polytorta* Dall, from the Carolina coast of the Atlantic.

Turris (Surcula) dotella Dall, n. sp.

Shell in general appearance resembling the last species but more acute and slender, the ribs only fourteen in number on the last whorl, straighter, sharper, with wider interspaces, crossed by, on the body of the last whorl, about a dozen similar, regular low ridges with narrower interspaces, the whole regularly and evenly, finely, spirally, sharply striated; the intersections at the ribs of the major spirals are distinctly nodulous, the same sculpture is continued on to the canal, but there is crowded and less coarse; on the spire there are three or four spiral ridges crossing the ribs, and one or two well marked cords close to and in front of the suture; there are nine whorls beside the (lost) nucleus; aperture narrower, anal sulcus narrow, sharply defined, but not very deep; pillar straight, with a thin, smooth, callous surface; outer lip thin, very little produced; canal short, wide, slightly recurved. Length of shell, 30.0; of aperture, 13.5; max. diam. 8.0 mm.

U. S. S. "Albatross," station 2823, Gulf of California, in 27 fathoms, sand and broken shells, U. S. N. Mus. 96,731.

Turris (Surcula) resina Dall, n. sp.

Shell (decollate) moderately large, slender, fusiform, solid, the spire longer than the aperture; shell with a broad, somewhat constricted anal fasciole and closely appressed suture, the fasciole chiefly sculptured by incremental lines; whorls with an angle at the shoulder where terminate (on the penultimate whorl twenty) straight, somewhat protractive, low, narrow, rather sharp axial ribs, which extend forward on the last whorl nearly to the base; incremental lines rather prominent; spiral sculpture of a few faint striae on the fasciole, between the fasciole and the next suture on the spire of five or six strap-like ridges with narrower interspaces often containing an obscure small intercalary thread, overriding the ribs without nodulation at the intersections; on the last whorl these ridges extend, somewhat diminishing in size, forward to the end of the canal, occasionally divided by a medial incised line, and with few intercalary threads, numbering about twenty-five in all; aperture narrow, outer lip defective, but by the lines of growth not much produced; anal sulcus shallow, pronounced, the posterior angle of the aperture produced, much thickened and recurved; pillar straight, smooth, callous, axis impervious; canal straight, rather wide; interior of outer lip smooth; length of (decollate) shell, the last five whorls, 50; of the last whorl, 33; of the aperture, 25; diameter at the posterior angle of the aperture, 17 mm.

U. S. S. "Albatross," station 3354, Gulf of Panama in 322 fathoms, mud, bottom temperature 46° F. U. S. N. Mus. 123,103.

This species has such a striking appearance that, although the unique specimen is defective, it could not fail to be recognized if found again.

A large shell very much broken and eroded with a somewhat similar form and sculpture, but smoother, the spirals fainter and the ribs rounder and less numerous, was dredged at station 3370, in 134 fathoms, near Cocos Island. It has a large amorphous mass of callus on the proximal end of the pillar, but which does not extend inward beyond the first half whorl, and may be a pathological feature. There are parts of about six whorls remaining, about 58 mm. in length and 17 in maximum diameter. It is too imperfect to name, but is different from any other species obtained.

Drillia decenna Dall, n. sp.

Shell small, white, solid, acute, with about eight whorls, the spire longer than the aperture; the two nuclear whorls are small, smooth and apically blunt, the succeeding ones have strong axial sculpture, but visible spiral sculpture is confined to the region of the canal; suture appressed, the anal fasciole inconspicuous; axial sculpture of (on the last whorl 8–10) sharp, slightly protractive ribs, most prominent on the periphery, the last rib preceding the formation of the adult aperture distinctly larger than the rest; the ribs though not invariably continuous form a series obliquely ascending the spire, and in front fading out only near the canal where there are a few spiral threads; on the surface when not worn, can be discerned with a lens fine spiral striations, but whether these are generally distributed my material is not fresh enough to show; aperture short, rather wide; anal sulcus short, conspicuous, with projecting margin; outer lip slightly varicose, sharp, produced; pillar smooth, short, straight, heavily callous; canal short, rather wide, the fasciole inconspicuous. Length, 12.5; of last whorl, 8.0; of aperture, 5.5; max. diam. 5.3 mm.

U. S. S. "Albatross," station, 2798, in 18 fathoms, sand, Panama Bay. U. S. N. Mus. 110,603.

This species is related to *D. ebur*, *D. coccinata* and *D. fucata* of Reeve, of the West Indies, but has fewer and less knobby ribs than any of them.

Gemmula exulans Dall.

Plate 13, figure 5.

Pleurotoma exulans Dall, Proc. U. S. Nat. Mus., 1889, **12**, p. 302, pl. **5**, fig. 7.

U. S. S. "Albatross," station 3376, off the coast of Ecuador, in 1132 fathoms, ooze, bottom temperature 36° F. U. S. N. Mus. 123,095.

An immature specimen of this species was obtained at the locality mentioned. The original specimens were obtained near the Galapagos Islands at stations 2807, in 812 fathoms, ooze, and 2808, in 634 fathoms, sand; temperatures 38°.4 and 40° F.

Gemmula esuriens Dall, n. sp.

Shell small, solid, subfusiform, of about five whorls, the nucleus defective; periostracum pale olive; suture distinct, not appressed; fasciole hardly constricted; whorls moderately rounded, the suture between them not deep; axial sculpture of incremental lines and about twelve peripheral rounded low nodules, hardly produced enough to be termed ribs; spiral sculpture in front of the periphery of 15–20 incised, rather distant, obscure lines extending to the canal; none is visible behind the periphery where the sculpture consists chiefly of incremental lines and faint traces of vermiculation; aperture lunate; anal sulcus wide, shallow; outer lip thin, simple, strongly protractive; body with a thin white callus; pillar short, very obliquely truncate anteriorly, more or less twisted but not pervious; canal short, wide, slightly recurved. Lon. of shell, 15.2; of last whorl, 10; of aperture, 7.5; max. diam. 6.5 mm.

U. S. S. "Albatross," station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F. U. S. N. Mus. 123,128; also at station 3407, near the Galapagos Islands, in 885 fathoms, ooze, temperature 37°.2; and at station 3392, Gulf of Panama, in 1270 fathoms, hard bottom; temperature 36°.4.

Gemmula esuriens var. pernodata Dall.

Shell defective, about three whorls remaining, resembling the last species in a general way, having the median vermiculate band, similar periostracum, aperture and pillar, but differing as follows: the whorls are separated by a deeper constriction; the fasciole less excavated and without spiral striae; the basal spiral sculpture is hardly perceptible; the ribs are reduced to nodules in front of the suture and more obliquely protractive and irregular or even obsolete; the vermicular sculpture is more or less extended over the base. Lon. of last whorl, 14.0; of aperture, 10.0; max. diam. 8.7 mm.

U. S. S. "Albatross," station 3414, southwest of Tehuantepec in the Pacific, in 2232 fathoms, green mud, temperature 38°.5 F. U. S. N. Mus. 123,127.

These specimens are so badly eroded that in order to get the diagnostic characters one has to study uneroded patches of surface, and, while the result is believed to be accurate, it was impossible to get a draughtsman who could restore the shell so as to make a reliable figure, so it was thought better to omit the figure pending the receipt of better material.

Gemmula herilda Dall, n. sp.

Shell rather small, stout, solid, chalky under an olivaceous periostracum; the spire longer than the aperture; whorls at least eight in the adult but usually much eroded; summit of the spire apparently blunt, the whorls in the young short in their axial dimension, giving a "chunky" aspect to the shell; early whorls with two beaded spiral series or cordons one at the posterior suture, and another, larger, near the anterior suture. Between them is the anal fasciole; as the shell grows the anterior beaded cordon becomes situated more near the centre of the exposed whorl and (on the fourth whorl about twenty) the nodulations represent the posterior terminations of narrow very protractive axial riblets, which on the fifth whorl fade out on the base; the anal fasciole is conspicuously marked with arcuate, close, fine ripples; in front of the shoulder in the young the whole base of the shell and canal are covered with close, fine, spiral threads, which as the shell grows older appear also on the anal fasciole; on the other hand in the older shells the nodular band next the suture and that at the periphery become less prominently sculptured and the ribs almost obsolete; aperture and canal short and wide; pillar with little callus, straight, solid; outer lip produced, thin, sharp, simple; anal sulcus wide, shallow, in the older shells nearly reaching the suture. Length of shell, about 18 +; of last whorl, 11.5; of aperture, 8.0; max. diam. 7.0 mm.

U. S. S. "Albatross," station 3360, Gulf of Panama, in 1672 fathoms, sand; bottom temperature 42° F. U. S. N. Mus. 123,091.

This species when old and eroded can hardly be distinguished from *G. esuriens* in the same condition, but fortunately specimens of the young shells in good condition could be compared and show obvious and sufficient characters proving the distinctions between the two species.

Gemmula benthima Dall, n. sp.

Plate 1, figure 7; Plate 13, figure 4.

Shell solid, with a conspicuous greenish-gray periostracum, ten-whorled, with the spire longer than the aperture, biconic, usually much eroded; nucleus lost in all the specimens; subsequent whorls appressed at the suture, in front of which is a strap-like revolving ridge with (on the fifth whorl twenty-two) low nodules, each one corresponding to a feeble, strongly retractive, lamella-like riblet, which becomes prominent again as a semilunate nodule on the anal fasciole which forms the periphery of the whorl; between the fasciole and the presutural band the whorl is a little excavated; on the anterior side of the fasciole the whorl is rounded, with more or less alternated low spiral threads stronger near the periphery, where the suture is laid on the second thread, and diminishing toward the canal; the interspaces are decidedly wider than the threads, which become more or less obsolete on the last whorl; the surface is also more or less reticulated by fine spiral striae and elevated lines of growth, giving it a rough aspect; last whorl much the largest; the anal fasciole situated a little above the normal periphery of the whorl, but by its own prominent sculpture becoming peripheral; the sulcus is narrow and square-cut; outer lip thin, simple; body with a white callus which extends forward upon the very short, obliquely truncate but not pervious pillar, which is slightly recurved; operculum normal, large, brownish. Lon. of shell, about 28 + (decollate); of aperture, 14; max. diam., 12 mm.

U. S. S. "Albatross," station 3392, off the Gulf of Panama in 1270 fathoms on hard bottom, temperature 36°.4 F. U. S. N. Mus. 123,089. Also at stations 2807, 3360, 3365, 3366, 3376 and 3413, in from 812 to 1360 fathoms, sand or ooze, temperatures 36° to 42° F. in the Gulf of Panama, the adjacent coast of Ecuador, and the Galapagos Islands.

This species is a typical Gemmula, with a narrow anal sulcus situated in the peripheral carina, an oval operculum with apical nucleus and concentric lines of increase, and nodose periphery. It is usually badly eroded.

Gemmula eldorana Dall, n. sp.

Plate 14, figure 8.

Shell small, solid, chalky with an olivaceous periostracum, decollate with about four and a half remaining whorls; suture obscure, with a narrow slightly elevated band in front of it, and on the last whorl a gradually developing similar band behind it; in front of the first band is a depression with two or three incised spiral lines, followed by a strong nodulous keel corresponding to the anal fasciole, in front of which again are (on the spire one, on the last whorl four) strong. simple, distant, spiral threads, of which the second is strongest and followed by the widest interval, the series preceded by eight or ten smaller, closer, simple, spiral threads which extend to the end of the canal; axial sculpture of incremental lines and on the earlier whorls obscure wrinkles connected with the nodules on the keel, which number on the penultimate whorl about twenty-four and on the last whorl become obsolescent; aperture short, lunate; outer lip sharp, with a well marked sulcus at the principal keel; body with the sculpture erased; pillar very short, twisted, obliquely truncate in front; axis not pervious; canal short, recurved, with flaring edges. Lon. of three whorls, 8; of last whorl, 6; of aperture, 4; max. diam. 5 mm. Operculum small, narrow, pale brown, nucleus apical.

U. S. S. "Albatross," station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F. U. S. N. Mus. 123,120. Also at station 2807, near the Galapagos Islands, in 812 fathoms, ooze, temperature 38°.4.

Another species of the same group but with distinctive sculpture.

Gemmula vicella Dall, n. sp.

Plate 14, figure 5.

Shell small, stout, subturrited, the nuclear whorls eroded, the spire longer than the aperture, with about six whorls in addition to the nucleus; white with a gray, olivaceous periostracum, the aspect much like a stumpy *Bela*; suture distinct, not appressed, whorl in front of it slightly constricted, sloping to a prominent keel at the shoulder; this slope is apparently coincident with the anal fasciole and is sculptured only by curved lines of growth and faint indications of axial ribs, which become more prominent in front of the shoulder, are stronger on the earlier whorls and number about fifteen on the penultimate whorl; these ribs are feeble, with wider interspaces, rounded, and protractive, becoming obsolete on the base and most of the last whorl; spiral sculpture strongest in the shoulder keel, which is a little nodulous where it crosses the ribs; in front of it are three to five spiral threads (on the spire) of which the second is strongest and faintly nodulous, the others feebler, more adjacent and simple; these become more numerous by intercalation, the last whorl having about sixteen between the keel and the end of the canal; the lines of growth are rather strong and give the surface a rough appearance; aperture short, anal sulcus shallow and feeble; outer lip sharp, thin, simple; body with the sculpture erased; pillar smooth short, obliquely attenuated, twisted; canal wide, short, funicular, slightly recurved. Lon. of (decollate) shell, 8.5; of last whorl, 6.0; of aperture, 4.0; max. diam. 4.5 mm.

U. S. S. "Albatross," station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F. U. S. N. Mus. 123,122.

Gemmula serilla Dall, n. sp.

Plate 13, figure 6.

Shell small, fusiform, sharply sculptured, white with an olivaceous periostracum, with about four whorls exclusive of the decollate apex; suture distinct not appressed, whorl in front of it descending flatly to a nearly peripheral keel, the flattened portion corresponding to the anal fasciole; fasciole spirally sculptured by four or five very fine, equidistant, simple, similar threads, crossed by (on the last whorl about twenty-five) elevated, sharp, arcuate, lamellar riblets, which are continued over the whorl with wider interspaces to the anterior part of the base; the shoulder keel is minutely duplex, narrow, subspinose where it crosses the ribs, and more prominent than they; in front of it are about twelve strong rounded primary spiral threads, with wider interspaces, each containing a finer intercalary thread, the whole extending to the end of the canal; aperture narrow, anal sulcus wide, shallow; outer lip sharp, simple; body smooth, pillar straight, obliquely attenuated in front; canal narrow, straight, rather produced. Lon. of (decollate) shell, 8.3; of last whorl, 6.0; of aperture, 4.5; max. diam. 4.0 mm.

U. S. S. "Albatross," station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F. U. S. N. Mus. 123,123.

The shell described appears to be not quite adult.

Leucosyrinx erosina Dall, n. sp.

Plate 2, figure 1.

Shell fusiform, white, with an olive-gray more or less dehiscent dull periostracum; nucleus eroded, subsequent whorls about seven; spire without the nucleus about equal in length to the aperture; suture appressed; a little in front of it is the anal fasciole, which is narrow, slightly constricted, and ill defined; in front of it and forming the shoulder of the whorl is a series of about twelve round-topped, slightly protractive, wavelike axial ribs, which only reach the suture in front of them in the earlier whorls, falling short of it in the later ones; other axial sculpture consists of rather irregular, more or less prominent incremental lines; spiral sculpture consists of three or more somewhat obscure incised lines over the fasciole; on the basal side of the whorl are numerous rather distant, distinct spiral striae, subequal and nearly equidistant, the interspaces a little elevated and, on the canal, becoming threads; in addition to these there are on the middle of the whorls a quantity of irregular, oblique, somewhat vermicular, short incised lines, the interspaces between which are faintly beaded or reticulated by the short segments they intercept of the incremental lines; traces of analogous sculpture can be observed with a lens also on the base; aperture semilunar; outer lip thin, sharp, with a shallow anal sulcus adjacent to the suture; body with the sculpture erased, white, polished; pillar solid, white, twisted, obliquely truncate in front; canal wide, short, recurved and flaring anteriorly; operculum rounded, triangular with an apical nucleus, pale brownish. Lon. of shell, 28; of aperture, 14; max. diam. 11.5 mm.

U. S. S. "Albatross," station 3360, Gulf of Panama, in 1672 fathoms, sand, bottom temperature 42°F. U. S. N. Mus. 123,106.

The specimens, like most of those from these depths, are badly eroded.

Leucosyrinx ? clionella Dall, n. sp.

Plate 14, figure 3.

Shell large, solid, chalky, with a rather thick olivaceous periostracum, and about seven whorls, the apex being eroded; spire much longer than the aperture, subfusiform, with whorls appressed at and constricted in front of the suture; the constriction corresponds to the anal fasciole behind which the margin of the whorl has the aspect of a thickened band; axial sculpture, beside incremental lines, consisting of twelve low, rounded, strong, slightly protractive ribs with subequal interspaces, strongest just in front of the fasciole, and, on the last whorl becoming obsolete on the base; spiral sculpture of numerous obsolete rather close spiral threads, irregularly disposed, stronger and much more distant on the base, but always obscure; aperture narrowly lunate, the anal sulcus conspicuous but shallow; the outer lip simple; body with a moderately thick, smooth callus extended onto the short, straight pillar, which is obliquely attenuated in front, with a wide, short, shallow canal. Lon. of five (decollate) whorls, 35.0; of last whorl, 22.5; of aperture, 15; max. diam., 12.5 mm.

U. S. S. "Albatross," station 3394, Gulf of Panama, in 511 fathoms, mud, bottom temperature 41°.8 F. U. S. N. Mus. 123,125. Also at station 2792, off Manta, Ecuador, in 401 fathoms, mud, temperature 43° F. (types).

This species has the thick olivaceous periostracum of a Clionella, as well as the sculpture of the typical Clionella, but a careful examination failed to discover any radula, though a poison gland seemed to be present. The head was that of typical Turris, with no muzzle, short tentacles with prominent eyes near their tips; the operculum oval, concentric, with the nucleus not lateral but near the smaller end, just within the margin of the apex.

Leucosyrinx ? pacifica Dall, n. sp.

Plate 12, figure 3.

Shell small, delicate, white with a pale yellowish periostracum, with at least six whorls beside the (lost) nucleus; spire acute, slender, longer than the aperture;

suture deep, appressed; whorls gently rounded; apical whorls with (on the third whorl about fifteen) very narrow, sharp, threadlike, vertical ribs with much wider interspaces, and at the suture numerous, irregular, small, retractive folds extending over the fasciole, with wider interspaces, nearly twice as many as there are ribs; on the succeeding whorls these ribs and folds grow sparser and weaker, so that on the sixth whorl ribs, folds and fasciole are obsolete or absent; on the spire, the axial sculpture is crossed by (on the third whorl about eight, on the sixth ten or a dozen) fine flat threads with wider interspaces, (increasing by interpolation), which override the ribs and rise above them but do not form nodules at the intersections; these spirals are very uniform and on the last whorl extend forward covering the canal, and are slightly scored by the incremental lines; aperture oval, not mature in the specimen, the anal sulcus obsolete; pillar and body polished, the surface erased, not callous; the pillar is short, gyrate, the axis pervious, but the canal is short, rather wide, with no siphonal fasciole; the outer lip only slightly produced, sharp and thin in the type specimen. Operculum concentric, pointed in front, with an apical nucleus. Lon. of (decollate) shell, 23; of last whorl, 15; of aperture, 10.5; max. diam. 7 mm.

U. S. S. "Albatross," station 2859, in the Pacific Ocean, in 1569 fathoms, ooze, bottom temperature 34°.9. U. S. N. Mus. 122,590.

This shell recalls Surculina, but has harsher sculpture and a large normal operculum. It may prove eventually to belong to a group other than Leucosyrinx.

Irenosyrinx persimilis Dall.

Plate 12, figure 2.

Leucosyrinx persimilis Dall. Proc. U. S. Nat. Mus., 1889, **12**, p. 301, pl. **6**, fig. 3.

Shell large, white, fusiform, with a pale olive periostracum, acute spire, and eight whorls, exclusive of the (lost) nucleus, each carrying a peripheral keel; suture distinct; whorls behind the periphery somewhat flattened, with a shallow constriction just behind the keel; axial sculpture only of incremental lines; spiral sculpture between the suture and periphery of numerous flat, subequal, strap-like bands separated by narrower, shallow channels; periphery with a low, rather wide prominence, giving the effect of a keel and sculptured with several similar but larger, stronger and more distant bands, tending to arrange themselves in pairs, and with a fine, subsidiary spiral striation upon them; this sculpture extends over the anterior half of the whorl, becoming finer and closer on the canal; aperture elongate; outer lip thin, sharp; a wide, deep, anal sulcus on the posterior slope of the whorl about midway between the suture and the periphery; anterior part of the lip arcuate, protractive; body with the sculpture erased, white, polished; pillar short, twisted, in front obliquely truncate and gyrate, but not axially pervious; a touch of brown on the edge; canal wide, elongate, slightly recurved, with no fasciole. Lon. of shell, 95; of last whorl, 70; of aperture, 55; max. diam. of shell, 32; of canal, 7 mm. Operculum brown, oval, the exterior imbricately lamellose, the nucleus inside the apical end which is bluntly rounded.

U. S. S. "Albatross," station 3393, Gulf of Panama, in 1020 fathoms, mud, bottom temperature 36°.8 F. U. S. N. Mus. 123,101. Also at station 3366, in 1067 fathoms, globigerina ooze, off Panama, bottom temperature 37° F.; at station 2791, on the S. W. coast of Chile, in 677 fathoms, mud, bottom temperature 38° F.; and at station 2919, off Cortez Bank, California, in 984 fathoms, mud, temperature 38° F.

The characteristics of the soft parts were described in the original publication. It may be added that *Pleurotoma* (*Surcula*) *clara* von Martens, from Patagonia, though much smaller, is evidently a member of this group.

The immense range of the species already indicated will be greatly increased if with the reception of more and better material the following form is definitely fixed as a variety of *persimilis*, which at present seems doubtful.

Irenosyrinx (persimilis) var ? leonis Dall.

Shell small compared with the preceding species, white, of about seven evenly rounded whorls. Compared with the young of *I. persimilis* of the same size the whorls are more capacious, smoother, not flattened behind nor on the periphery; the carinations of *persimilis* are wanting or represented only by an obsolete indication of a ridge; the canal is wider and more recurved, the anal fasciole shows the markings of the sulcus to be wider and not quite so near the suture. Lon. of shell, 50; of last whorl, 38; of aperture, 29; max. diam., 18 mm.

U. S. S. "Albatross," station 3074, off Sea Lion Rock, coast of Washington, in 877 fathoms, mud, temperature 36°.6 F. U. S. N. Mus. 110,605.

Three specimens were obtained, of which all were more or less eroded.

Irenosyrinx goodei Dall.

Plate 19, figure 2.

Leucosyrinx goodei Dall, Proc. U. S. Nat. Mus., 1889, **12**, p. 300, pl. **6**, fig. 1.

U. S. S. "Albatross," station 2788, in 1050 fathoms, mud, bottom temperature 36°.9 F.

Figured for comparison with *I. persimilis*.

Irenosyrinx ? crebristriata Dall, n. sp.

Plate 13, figure 10.

Shell of moderate size, white, covered with a pale yellow periostracum; spire acute, a little shorter than the aperture; whorls rounded, six in number exclusive of the (lost) nucleus; suture very distinct; axial sculpture none, except incremental lines, unless on the (eroded) apical whorls; siphonal fasciole wide, extending from the suture to an obscure ridge which forms the shoulder of the whorl just behind the periphery; on the fasciole are six or seven smooth rounded subequal spiral threads with equal or wider interspaces, more crowded anteriorly; beyond the shoulder are nine similar but coarser threads, sometimes entire, sometimes flattened or even medially sulcate on top, extending over the base, and on the region of the canal as many more, smaller and more distant, crossed by obvious incremental lines; aperture elongate, rather narrow, anal sulcus very wide but shallow; outer lip produced, evenly arcuate to the end of the canal, not constricted at the base of the whorl; pillar lip smooth, pillar short, obliquely truncate, gyrate, the axis pervious; canal wide, hardly differentiated. Lon. of shell, 48; of last whorl, 35; of aperture, 26; max. diam. 16.5 mm.

U. S. S. "Albatross," station 2859, Pacific Ocean, in 1569 fathoms, ooze, bottom temperature 34°.9 F. U. S. N. Mus. 122,563.

The soft parts and operculum were not obtained, so the shell is only provisionally placed in this group. It recalls the shell described by me in the Blake Report from Cuba under the name of *Aforia hypomela*, but which is perhaps an Irenosyrinx. The latter has the spiral sculpture more delicate, the posterior slope of the whorls flattened, and the whorls more numerous.

Ancistrosyrinx cedonulli Reeve.

Pleurotoma cedonulli Reeve, Proc. Zool. Soc., London, 1843, p. 185; Conch. Icon, *Pleurotoma*, fig. 117 *a*.

U. S. S. "Albatross," station 2799, in Panama Bay, in 30 fathoms, mud; and station 3391, Gulf of Panama, in 153 fathoms, mud, bottom temperature 55°.8 F. U. S. N. Mus. 123,102.

Several fairly well preserved specimens were obtained, as above, but without the animal. There is no doubt that the species belongs to the same group of Turritidae that includes the Atlantic coast *A. elegans* and *A. radiata* Dall, which have granular sculpture and an operculum like Drillia. That Tryon, who knew the Panama species only from an inadequate figure, should have regarded it as the young of the Japanese Columbarium (with a wrong locality) was under the circumstances not extraordinary, though erroneous. The relations of this group to Cochlespira Conrad, its Eocene precursor, have already been alluded to (see page 257). In view of the ambiguity of Reeve's figure it might be well to say that this species has no axial sculpture on the whorls between the carina and the base except what may be due to accidents during growth. The surface is normally smooth and polished, above and below the carina, and of a delicate pale brown color.

Steiraxis aulaca Dall.

Plate 2, figure 5.

Pleurotoma (*Steiraxis*) *aulaca* Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 14.

Shell large, solid, white, fusiform, with about five whorls (nucleus eroded) covered with a pale straw-colored epidermis; whorls rounded, with rather distinct lines of growth, crossed by numerous very sharp, narrow, prominent, subequal spiral ridges with about equal or narrower interspaces; the periphery is formed by a sort of rib, on which stand two to four similar keels, but smaller than the others and more crowded; in front of the rib there is a faint constriction of the whorl; the keels are less prominent on the canal, which is moderately long and recurved; on the penultimate whorl there are about fourteen keels between the sutures; aperture elongate, reflecting the sculpture, but without lirae; outer lip very flexuous, with a broad, rather shallow anal sulcus behind, and arched forward in front of the peripheral rib; body white, not callous; pillar thin, attenuated, and obliquely truncate in front, concave, twisted, exhibiting a pervious axis; canal shallow, not producing a fasciole; operculum like that of *Mohnia frielei*. Height of shell, 60; of last whorl, 48; of aperture, 38; max. diam. 26 mm.

U. S. S. "Albatross," station 3415, off Acapulco, Mexico, in 1879 fathoms, globigerina ooze, bottom temperature 36° F. U. S. N. Mus. 123,099. Also at station 3381, east of Malpelo Island, Gulf of Panama, in 1772 fathoms, mud, bottom temperature 35°.8 F. U. S. N. Mus. 123,098.

The initiatory part of the operculum is spiral, as in Mohnia, thus differing from the typical deep-water Turritidae, which it in general resembles. They have the nucleus of the operculum apical and not spiral. It differs from the operculum of Irenosyrinx in being enlarged at the inner posterior margin as in Lunatia, so that the spiral apex remains apical, while in Irenosyrinx the operculum after a brief period of spiral growth is entirely surrounded by concentric additions, so that the spiral portion is within a subsequent concentric margin, like the nucleus of the operculum in Buccinum.

CALLIOTECTUM Dall.

Calliotectum Dall, Proc. U. S. Nat. Mus., 1889, **12**, p. 304.

Calliotectum vernicosum Dall.

Calliotectum vernicosum Dall op. cit., p. 304, pl. **5**, fig. 8, 1889.

U. S. S. "Albatross," station 2793, off the coast of Ecuador, in 741 fathoms, mud; station 2807, near the Galapagos Islands, in 812 fathoms, mud, bottom temperature in both cases 38°.4 F. Also at station 3407, off the Galapagos Islands in 885 fathoms, bottom temperature 37°.2; and at station 4654 twenty-four miles W. 05° N. from Aguja Point on the Peruvian coast, in 1036 fathoms, mud, bottom temperature 37°.3. Both the latter stations afforded fragments only.

A full account of the animal was given in the publication of 1889.

MANGILIINAE.

BORSONIA Bellardi, 1838.

Borsonia (Borsonella) dalli Arnold.

Plate 13, figure 9.

Pleurotoma (*Borsonia*) *dalli* Arnold, Mem. Cal. Acad. Sci., 1903, **3**, p. 201, pl. **6**, fig. 2.

Pliocene and Pleistocene of San Pedro, Arnold. U. S. S. "Albatross," station 2839, in 414 fathoms, sand, bottom temperature 41°.4 F., and 2918, in 67 fathoms, sand, temperature 52°.4; off the edge of the Cortez Bank, N. Pacific Ocean. U. S. N. Mus. 96,841 and 122,576.

Borsonia (Borsonella) agassizii Dall, n. sp.

Plate 1, figure 5.

Shell biconic, the aperture shorter than the spire, apex eroded but with six remaining whorls, white and chalky under a pale greenish yellow periostracum; suture distinct, not appressed, the whorls sloping flatly to the periphery which is marked by a rounded keel with (on the last whorl fifteen) obscure elongated swellings or nodulations; the anal fasciole which is close to the suture is marked by lines of growth concavely arcuate, crossed by half a dozen spiral incised lines in the path of the sulcus; below the keel are lines of growth, obscure traces of spiral distant incised lines, and numerous irregularly impressed striae, which are perhaps pathological; base moderately convex; outer lip thin, sharp, strongly protractive below the keel, above the latter with a wide, shallow anal sulcus reaching close to the suture; body polished, milkwhite; pillar short, twisted, white, with a well-marked spiral plait near its insertion; canal wide, short, distally funicular, somewhat recurved. Lon. of shell (decollate), 23; of last whorl, 15; of aperture, 11; max. diam. 11 mm.

U. S. S. "Albatross," station 3361, Gulf of Panama, in 1471 fathoms, ooze, bottom temperature 36°.6 F. U. S. N. Mus. 123,107.

This species resembles *B. diegensis* Dall in outline, but is larger, has the carina proportionately nearer the middle of the whorl, and the nodulation of the keel is strongest on the last whorl; while in *diegensis* it is more marked on the earlier whorls and is sometimes entirely obsolete on the later ones. The latter species also has the vermicular impressed sculpture finer and much closer, though this may be pathological.

Borsonia (Borsonella) diegensis Dall, n. sp.

Plate 13, figure 11.

Shell small, stout, solid, decollate, with a whitish substratum and strong olivaceous periostracum; the four remaining whorls are closely coiled and have the aperture longer than the remaining portion of the spire; the sculpture consists of a strong spiral keel, peripheral on the spire with more or less nodulation (in one specimen with fifteen small modules on the penultimate whorl, but none on the last whorl; another has them obsolete on the spire), stronger on the earlier whorls when present, an obscure ridge in front of the suture, stronger on the earlier whorls, faint spiral striation on the anal fasciole between the ridge and the keel, the whole surface covered with a microscopic, close, impressed, vermicular network of fine lines anastomosing in every direction; on the last whorl the keel is well above the periphery; base evenly rounded, aperture ample, anal sulcus at the suture wide and deep; outer lip thin, arcuately produced; pillar lip smooth, with a glaze of callus, the plication on the proximal part of the pillar lagging behind the aperture; canal very wide and short with an obsolete fasciole. Length of four whorls, 15.0; of last whorl, 12.5; of aperture, 9.5; max. diam. 8.0 mm.

U. S. S. "Albatross," station 2923, off San Diego, California, in 822 fathoms, mud, bottom temperature 39°F. U. S. N. Mus. 122,573.

Like the preceding species this has the plication on the pillar hardly visible from the aperture.

Borsonia (Borsonella) hooveri Arnold.

Plate 13, figure 7.

Pleurotoma (*Borsonia*) *hooveri* Arnold, Mem. Cal. Acad. Sci., 1903, **3**, p. 201, pl. **10**, fig. 1.

Shell small, chalky-white, covered with a polished olive-gray periostracum; apex eroded, leaving indications of about six whorls; general form biconic with a single sharp keel at the shoulder, between which and the suture the whorl is more or less excavated; suture distinct, the margin in front of it turgid, giving an effect as if minutely channelled; excavated area forming the anal fasciole, with arcuate growth lines, crossed by about six faint incised distant spiral lines; keel somewhat above the periphery, with a rounded and somewhat compressed edge without waves or nodulations; surface in front of the keel moderately convex, spirally sculptured by obsolete distant lines crossed by fine irregular slightly elevated incremental lines, which, in spots, produce a vermiculate aspect; base a little constricted behind the short, nearly straight, attenuated canal; body with a wash of callus; outer lip with a wide, moderately deep, rounded anal sulcus; in front of the keel markedly protractive, thin and simple; pillar straight, moderately callous, with a single strong almost horizontal plait near its insertion, anteriorly obliquely truncate, twisted, not pervious; canal very short. Lon. of (decollate) shell, 14.7; of last whorl, 10; of aperture, 7.5; max. diam. 8 mm.

Pleistocene of San Pedro, California, Arnold.

U. S. S. "Albatross," station 3431, off Mazatlan, Mex., in 995 fathoms, mud, bottom temperature 37° F. U. S. N. Mus. 123,110. Also at station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4; and station 3376, on the coast of Ecuador, in 1132 fathoms, ooze, temperature 36° F.

Smaller, more slender, and with a distinctly more excavated fasciole than in the last species which also has the keel usually nodulous. In the better preserved specimens the spiral sculpture is continued in front of the keel while in the two preceding species it is confined to the anal fasciole.

Borsonia (Borsonella) saccoi Dall, n. sp.

Shell much eroded, solid, short, chalky, with an olive-gray periostracum and over five whorls; spire short, conic, nuclear whorls lost; the anal fasciole depressed, forming a constricted concave band near the posterior edge of the whorl which is thickened and marginate; on the anterior side of the fasciole the shoulder of the whorl forms the periphery on which are (thirteen on the last whorl) short, rounded, wavelike nodules or axial ribs which are slightly protractive and do not extend over the base; the other axial sculpture is composed of rather marked elevated, more or less irregular lines of growth; on the fasciole and base these are more or less obscured by spiral impressed lines with much wider interspaces, which appear feeble and as if obsolete where not eroded; canal short, straight; outer lip simple with the sulcus near the suture, rather wide and deep when complete; body with a white callus and near the insertion of the pillar a single very strong sharp edged spiral plication extending into the spire. Lon. of (eroded) shell, about 14; of aperture, about 7 mm.; max. diam. about 7 mm.

U. S. S. "Albatross," station 3354, Gulf of Panama, in 322 fathoms, mud, bottom temperature 46° F. U. S. N. Mus., 123,105.

Although this specimen is so imperfect it is clearly distinct from any other collected in the region and is therefore worthy of description. It differs from the others in its stronger ridge in front of the suture, its fewer, longer, and more persistent ribs. The plication on the pillar extends fully to the columellar callus, and is quite conspicuous.

Borsonia (Borsonella) coronadoi Dall, n. sp.

Plate 14, figure 2.

Shell slender, acute, pinkish white, with a pale brown periostracum and about ten whorls; spire longer than the aperture, the nuclear whorls smooth, turgid, the subsequent turns carrying a rounded low keel, usually in front of the middle of the whorls forming the spire, the area between which and the suture is flatly impressed, the whorl in front gently rounded; on some of the early whorls the keel is slightly undulated, but not regularly nodulous; besides the lines of growth, both the fasciole and the anterior part of the whorl show indications under a lens of obscure regular distant spiral striae, and are also more or less marked with a faint vermicular reticulation of the surface; suture not appressed, distinct; aperture narrow, anal sulcus deep and wide, reaching the suture; outer lip thin, sharp, arcuately produced; inner lip slightly eroded, polished, with no callus;

plication at the proximal end of the pillar; axis impervious, canal short, wide, deep, slightly recurved with a fairly well-marked fasciole. Lon. of shell, 29.0; of last whorl, 16.5; of aperture, 12.0; max. diam. 9.0 mm.

U. S. S. "Albatross," station 2931, off Los Coronados Islands, California, in 34 fathoms, sand, bottom temperature 56° F. U. S. N. Mus. 110,608.

This is nearest *B. dalli* Arnold, but of a different color, more slender, and on the last whorl has the flattened fasciolar area very much wider. The fold on the pillar is easily visible.

PLEUROTOMELLA Verrill.

Pleurotomella (Gymnobela) agonia Dall.

Plate 1, figure 6.

Pleurotomella (*Gymnobela*) *agonia* Dall, Proc. U. S. Nat. Mus., 1889, **12**, p. 307, pl. 6, fig. 4.

Shell large, thin, chalky, with a pale straw-colored periostracum; form biconic, with a presumably blunt, eroded apex and about seven whorls; suture distinct, minutely channelled; the margin in front of the suture is turgid and pinched up into numerous short, narrow, obliquely retractive small folds with wider interspaces and rounded summits; these become obsolete on the last whorl; there are about twenty-one on the penultimate whorl, and they do not cross the anal fasciole which is gently excavated; on the shoulder of the whorl are a series of lunate projections corresponding to the anal sulci (about nineteen on the penult whorl) less distinct and prominent than the sutural folds but larger: the whole surface is spirally sculptured with small low flattish ridges finer and closer on each side of the shoulder but elsewhere subequal and nearly equidistant, with subequal interspaces which become somewhat wider near the canal; there are also numerous very fine spiral striae and lines of growth forming a microscopic obscure reticulation; base rounded, attenuate in front; outer lip (defective) thin, simple, with a wide shallow anal sulcus at the shoulder; body and pillar slightly callous, with the appearance (which may be pathological) of an internal spiral ridge on the pillar not visible from the aperture; pillar straight, very obliquely truncate and twisted in front; canal moderately wide, not recurved. Lon. of (decollate) shell, 25; of last whorl, 18.5; of aperture, 14; max. diam. 12 mm.

U. S. S. "Albatross," station 2808, near the Galapagos Islands, in 634 fathoms, coral sand, bottom temperature 40° F. U. S. N. Mus. 96,493. Also at 2807, in 812 fathoms, ooze, temperature 38°.4.

Pleurotomella (Gymnobela) agonia var. altina Dall, nov.

Plate 14, figure 9.

Shell large, thin, pinkish brown, biconic, spire slightly longer than the aperture with seven well-rounded whorls in addition to the (lost) nucleus; suture distinct, not appressed, the anal fasciole forming a sharply limited band immediately in front of it; fasciole polished, sculptured with small numerous elevated concave wrinkles, with regular wider interspaces; these wrinkles on the last whorl become closer and less prominent; axial sculpture of inconspicuous irregular protractive depressions hardly to be distinguished from emphasized lines of growth; spiral sculpture of numerous fine, channelled, incised lines with wider flattened interspaces, five or six to a millimeter, the whole more or less minutely reticulated by the incremental lines; aperture narrow, the anal sulcus parallel-sided, deep; the outer lip arcuate, strongly protractive, thin, sharp, simple; pillar and body without callus; pillar straight, twisted, almost pervious at the axis; canal short, wide, slightly recurved. Lon. of shell, 24; of last whorl, 16; of aperture, 12; max. diam. 11.5 mm.

U. S. S. "Albatross," station 3365, off Cocos Island, Gulf of Panama, in 1010 fathoms, ooze, bottom temperature 37° F. U. S. N. Mus. 123,136. Also at station 3366, in 1067 fathoms, ooze, temperature 37° F. (type).

This differs from the typical *P. agonia* in having more numerous, finer and less prominent spirals which are not cut into short segments by the incremental lines, and a higher and more acute spire of at least one more whorl, giving the whole shell a more elevated and slender aspect.

Pleurotomella (Gymnobela) egregia Dall, n. sp.

Shell of the same type as the preceding species, but larger and proportionally much stouter, of the same pinkish brown color and delicate construction, and about five whorls; spire subconoid, with distinct suture and well-rounded whorls; sculpture similar to that of *P. agonia* but more emphatic, particularly the arcuate wrinkles which cross the anal fasciole; aperture wide, anal sulcus deep and rounded, the outer lip thin, roundly produced in front, no perceptible callus on the body; pillar thin, twisted, obliquely truncate in front; canal very short and rather contracted, axis not pervious. Lon. of shell, 23; of last whorl, 18; of aperture, 13; max. diam. 11.7 mm.

U. S. S. "Albatross," station 4656, 100 miles west of the Peruvian coast, in 2222 fathoms, mud, bottom temperature 35°.2 F. U. S. N. Mus. 110,610.

In this species the spiral sculpture is well defined and emphatic over the whole surface.

Pleurotomella (Gymnobela) isogonia Dall, n. sp.

Plate 4, figure 3.

Shell short, stout, biconic, white or subtranslucent with a yellowish periostracum; apical whorls much eroded, indicating for the whole shell six or more turns; suture appressed, whorl in front of it steeply descending to a very strong keel at the shoulder, behind which it is slightly excavated; this area is spirally sculptured with numerous, very fine, close-set threads, one of which, two-thirds of the way to the keel, is more prominent than the others; these are crossed by numerous rather irregular low sharp ridges strongest near the keel, which they nodulate more or less, especially on the earlier whorls, and, fading out toward the suture, faintly reticulating the spirals; keel high, sharply compressed below, with a rounded edge; whorl in front of it spirally sculptured with numerous flat low ridges with narrower channelled interspaces, the ridges crossed by fine sharp lines of growth and occasional faint vertical folds, low and obsolete except near their beginning in front of the keel; body polished, with the sculpture erased; outer lip angulated and notched by the keel, thin, sharp, simple; pillar short, white, with a faint brown band around it; the anterior portion acute, and obliquely truncate; canal short, slightly recurved. Lon. of (eroded) shell, 12.5; of last whorl, 11.0; of aperture, 9.0; max. diam., 7.7 mm.

U. S. S. "Albatross," station 3393, Gulf of Panama, in 1020 fathoms, mud, bottom temperature, 36°.8 F. U. S. N. Mus. 123,112.

This is quite a peculiar shell, and looks more like one of the northern Belas than any of the preceding species.

Pleurotomella (Gymnobela) xylona DALL, n. sp.

Plate 2, figure 3.

Shell thin, white, elongate, subturrited, with eight whorls beside the (lost) nucleus; suture distinct, deep, not channelled; whorl in front of it sloping flatly to an angular shoulder, sculptured with three or four flattish spiral threads with slightly wider interspaces separated from the keel at the shoulder by a channel three times as wide as the others; shoulder keel duplex, the posterior cord most prominent, the anterior, closely adjacent, less so; in front of these, extending to the canal, is a series (five on the penult, eighteen on the last whorl) of similar but less prominent, subequal, and subequidistant cords, with numerous smaller intercalary threads, the interspaces wider than the primary cords; from the shoulder to the periphery on the last whorl are (on the type about fourteen) numerous obscure narrow vertical riblets extending to but not over the base, but not nodulating the superincumbent cords; there are also numerous very fine, slightly prominent lines of growth which tend to roughen the spiral sculpture; aperture short, wide; outer lip (defective) thin, simple; body with the sculpture erased, polished, milk-white; pillar very short, gyrate, almost pervious; canal very short and wide. Lon. of shell, 27; of last whorl, 16; of aperture, 12; max. diam. 12 mm.

U. S. S. "Albatross," station 3413, near the Galapagos Islands, in 1360 fathoms, ooze, bottom temperature 36° F. U. S. N. Mus. 123,111.

A form of problematical relations, perhaps least out of place here, until more is known about it.

Pleurotomella (Pleurotomella) polystephanus Dall, n. sp.

Shell of moderate size of six or more whorls, the apex eroded, white, with a cream-colored periostracum; spiral sculpture of numerous fine, subequal, flattish threads with narrower interspaces, which cover the whole shell; to these are added a thickened ridge which borders the anterior margin of the suture, and on the spire a peripheral nodose keel, which is less marked on the last whorl, where it forms the shoulder; on the penultimate whorl there are twenty of these nodules; other axial sculpture is furnished by fine, short, sharp elevated wrinkles which cross retractively the ridge adjacent to the suture, like the "gathers" of a skirt, and become obsolete on the fasciole; there are twenty-eight of these wrinkles on the margin of the penultimate whorl; the space above the shoulder is distinctly excavated, especially on the spire; suture distinct and, on the earlier whorls, almost channelled; aperture ovate; anal fasciole comprised in the nodose shoulder, not reaching the suture; outer lip arcuately produced forward; pillar with a thin, smooth layer of enamel, obliquely attenuated distally, somewhat twisted; canal wide, shallow. Lon. of shell, 25; of last whorl, 19; of aperture, 14.5; max. diam. 12.5 mm.

U. S. S. "Albatross," station 2808, near the Galapagos Islands, in 634 fathoms, sand, bottom temperature 40° F. U. S. N. Mus. 96,498.

The several encircling rows of nodosities or wrinkles give this shell a particularly elegant appearance.

Pleurotomella (Pleurotomella) dinora Dall, n. sp.

Shell small, short-fusiform, stout, white with a pale yellowish periostracum, and about seven whorls; apex defective, subsequent whorls rather rapidly increasing, with an appressed suture behind a smooth and constricted anal fasciole in front of which the shell is shouldered by a series of short, slightly protractive ribs, of which, on the penultimate whorl there are fifteen, with subequal interspaces and crossed by half a dozen irregularly spaced spiral striations; these striae are ill defined, and on the last whorl extend over the base of the shell to the canal; on the last half of the last whorl the ribs become obsolete; aperture narrow, anal sulcus at the suture wide and deep, the outer lip in front of it prominently arcuate, thin and simple; pillar lip smooth with a thin wash of callus; pillar twisted, rapidly attenuated; axis impervious; canal moderately wide, short and slightly recurved. Length of (decollate) five whorls, 15; of last whorl, 11; of aperture, 8; max. diam. 7 mm.

U. S. S. "Albatross," station 2807, near the Galapagos Islands, in 812 fathoms, ooze, bottom temperature 38°.4 F. U. S. N. Mus. 96,479.

This a pretty but small form, which recalls in its general aspect several of the larger Atlantic species.

Pleurotomella (Pleurotomella) esilda Dall, n. sp.

Shell fusiform, the spire longer than the aperture, chalky, apically eroded, with a pale gray, very thin periostracum and about five remaining whorls; suture appressed with a slightly constricted anal fasciole in front of it and about sixteen subequal, low, rounded protractive ribs crossing the upper whorls from in front of the fasciole with subequal interspaces and, on the last whorl, ceasing rather abruptly near the periphery; these ribs are not particularly strong or abrupt at their beginning; spiral sculpture of six or eight faintly incised lines in front of the suture and on the fasciole, and beginning again on the base near the anterior ends of the ribs and continuous but not sharp over the base and canal; the band between the two series includes the ribbed part of the whorl and is sculptured with irregular, more or less retractive, oblique, vermicular, more or less punctate markings which override ribs and intervals with about the same strength as the spirals; whorls moderately rounded, spire subacute; anal sulcus wide, shallow; outer lip thin, simple; body with a wash of callus extending also over the short, straight, obliquely truncate, slightly twisted pillar; canal short, wide. Lon. of five (decollate) whorls, 23.5; of last whorl, 16.0; of aperture, 11.0; max. diam. 9.7 mm.

U. S. S. "Albatross," station 3395, Gulf of Panama, in 730 fathoms, rocky bottom, temperature 38°.5 F. U. S. N. Mus. 123,126.

Not unlike the preceding in sculpture but larger, less compact, and with a different minor sculpture.

Pleurotomella (Pleurotomella) suffusa Dall.

Plate 14, figure 10.

Pleurotomella suffusa Dall, Proc. U. S. Nat. Mus., 1889, **12**, p. 308, pl. **12**, fig. 10.

U. S. S. "Albatross," station 2807, near the Galapagos Islands, in 812 fathoms, ooze, bottom temperature 38°.4 F. U. S. N. Mus. 92,533.

Pleurotomella (Pleurotomella) parella Dall, n. sp.

Plate 14, figure 4.

Shell large, thin, elongate-fusiform, white with a very thin translucent periostracum, and about eight whorls exclusive of the (lost) nucleus; spire rather acute; suture slightly appressed, whorl in front of it polished and slightly constricted; margin of the whorl here and there obscurely plicate by the incremental lines; surface of the fasciole here and there marked by obscure, irregular, short, oblique, fine ridges at right angles to the lines of growth; in front of the fasciole are (on the penultimate whorl fourteen) low, feeble, protractively oblique ribs, with much wider shallow interspaces, hardly reaching the suture in front on the spire or the periphery on the last whorl; spiral sculpture confined to the whorl in front of the fasciole and consisting of (on the penultimate whorl about fifteen) fine, sharp incised lines, on the body of the whorl rather distant, the interspaces flat and often unequal but toward the canal closer and more regular; aperture semilunar; anal sulcus near the suture, wide, shallow; outer lip very thin, sharp, simple; body polished; pillar straight, gyrate, obliquely truncate in front; axis pervious; canal short, wide, in front slightly flaring. Lon. of shell, 41; of last whorl, 24; of aperture, 16; max. diam. 13.5 mm.

U. S. S. "Albatross," station 3376, off the coast of Ecuador in 1132 fathoms, ooze, bottom temperature 36° F. U. S. N. Mus. 123,135.

Pleurotomella (Pleurotomella) sp. indet.

A species of this group, but with the exterior so eroded as to be unrecognizable, though apparently different from any heretofore mentioned, was obtained East of Mapelo Island, in the Gulf of Panama, at station 3381, in 1772 fathoms, mud, bottom temperature 35°.8 F., and at station 3418, off Acapulco, Mexico, in 660 fathoms, sand, temperature 39°. U. S. N. Mus. 123,124.

Pleurotomella (Phymorhynchus) argeta Dall.

Plate 19, figure 8.

Pleurotomella argeta Dall, Proc. U. S. Nat. Mus., 1889, **12**, p. 307, pl. **6**, fig. 5.

U. S. S. "Albatross," station 2807, near the Galapagos Islands, in 812 fathoms, mud, bottom temperature 38°.4 F. U. S. N. Mus. 96,552. Also at station 3407, in 885 fathoms, ooze, temperature 37°.2 F. U. S. N. Mus. 123,138.

Though snow-white and perfectly smooth, except for incremental lines, this species by the characters of the animal belongs with the brown spirally sculptured forms which follow.

Pleurotomella (Phymorhynchus) cingulata Dall.

Plate 19, figure 6.

Pleurotomella cingulata Dall, Proc. U. S. Nat. Mus., 1889, **12**, p. 306, pl. **6**, fig. 2

U. S. S. "Albatross," station 2793, off the coast of Ecuador, in 741 fathoms, mud, bottom temperature 38°.4. Also at station 2807, near the Galapagos Islands, in 812 fathoms, mud, same temperature. U. S. N. Mus. 96, 554.

This very handsome species is fully described and figured in the publication referred to above.

Pleurotomella (Phymorhynchus) castanea Dall.

Plate 1, figure 1.

Pleurotomella castanea Dall, Proc. U. S. Nat. Mus., 1895, **18**, p. 15.

Shell polished, thin, resembling *P. cingulata*, Dall, of a chestnut-brown color, fading to a paler pinkish-brown, with seven whorls; the nucleus eroded, the early whorls with four or five flattened elevated spirals with wider interspaces in front of a somewhat sloping anal fasciole, more or less reticulated by narrow, slender, irregular, elevated riblets in harmony with the lines of growth, and which form on the fasciole delicate arches concave forward; the suture is appressed; on the body are about twenty spirals, stronger at the shoulder, smaller and closer forward, the wide interspaces finely spirally striate, while the most prominent spirals are undulate or obscurely nodulous; the transverse sculpture is nearly obsolete and hardly to be distinguished from the incremental lines; aperture elongate, oval; outer lip thin, sharp, crenulated by the sculpture, but not lirate; anal sulcus shallow, wide, directly in front of the suture; body with a thin wash of callus; pillar thin, gyrate, attenuated in front, forming a narrowly pervious axis, the whole of a pinkish-brown color; canal short, shallow, not recurved. Height of shell, 53; of last whorl, 38; of aperture, 28; diameter, 23 mm.

U. S. S. "Albatross," station 3400, in 1322 fathoms, ooze, temperature 36° F.; eastward from the Galapagos Islands. U. S. N. Mus. 123,134.

This differs from *P. cingulata* Dall by its smaller size, more sloping whorls, more delicate and reticulate sculpture, and by its pervious axis. The animal is blind, and there is no operculum. There is a distinct muzzle into which the proboscis is retracted when at rest, as described under *Pleurotomella argeta* in 1889, and at page 258 of this report. Specimens were also obtained at station 3374, Gulf of Panama, in 1823 fathoms, ooze, bottom temperature 36°.4; and at station 3413, in 1360 fathoms, ooze, near the Galapagos Islands, temperature 36°F.

Pleurotomella (Phymorhynchus) oceanica Dall, n. sp.

Shell short, stout, white, the spire shorter than the aperture, including about six whorls; nucleus eroded, whorls rounded, but the shoulder rather posterior, giving a subtabulate aspect to the whorls; suture distinct, not channelled; axial sculpture of fine, close, subequal lines in harmony with the lines of growth; spiral sculpture of numerous flat, longitudinally striated straplike slightly elevated bands, with subequal interspaces about half a millimeter wide, or less; there is a slight arcuation in the lines of growth but no anal fasciole; aperture pyriform, outer lip thin, simple, sharp, with no anal sulcus; body with a thin wash of white callus; pillar short, twisted but not pervious, obliquely attenuated in front; canal hardly defined, wide, very short, slightly recurved; alt. 25; of last whorl, 20; of aperture; 15; max. lat. 15 mm.

U. S. S. "Albatross," station 3681, in Mid-Pacific, north latitude 28° 23′, west longitude 126° 57; in 2368 fathoms, ooze, bottom temperature 34°.6 F. U. S. N. Mus. 110,751.

The animal has a distinct subcylindrical muzzle, slightly expanded distally, into which the proboscis is withdrawn; the tentacles are rather posterior, small, short, and subcylindric; there are no eyes and no operculum. The foot is short and blunt behind, double edged at the front margin which is straight; the verge is small, coiled in a loose turn and laid back, the extremity with a lateral point; the siphon is thick and separate from the mantle-edge, without appendages; there is a moderately long retractile proboscis and a poison gland. The teeth of the radula are very like those of *Pleurotomella packardi* as figured by Verrill, there are two rows of about forty teeth each. The exterior of the animal is whitish throughout.

Pleurotomella (Phymorhynchus?) clarinda Dall, n. sp.

Plate 1, figure 3.

Shell white, with a pale yellowish periostracum, thin, fusiform, six whorled; whorls rounded, flattened a little over the anal fasciole in front of the suture, which is very distinct but not channelled; nuclear whorls eroded; subsequent whorls, with between the suture and the shoulder five or six fine, sharp, spiral threads with wider interspaces, which are not beaded by the concavely arcuate growth lines which are prominent on the fasciole; at the shoulder is a weak spiral ridge, followed by five stronger ones, subequal and equidistant with wider interspaces; on a sixth similar ridge the suture is wound, followed by, on the base, about thirty similar but less prominent ridges which gradually diminish in size and strength, and approximate more closely to each other until the canal is reached; over all these ridges and interspaces fine sharp threads run spirally, as on the fasciole and are perhaps a little more prominent on the ridges, where they are rendered more or less scabrous by the elevated lines of growth; outer lip thin with a shallow rounded excavation, near the suture, which forms the anal sulcus; body polished, with the spiral sculpture erased; pillar thin, gyrate, pervious, white, with a slightly thickened edge; canal short, wide, slightly recurved. Lon. 39; last whorl, 30; aperture, 22; max. diam. 18 mm.

U. S. S. "Albatross," station 3381, east of Malpelo Island, Panama Bay, in 1772 fathoms, mud, bottom temperature 35°.8 F. U. S. N. Mus. 123,097.

The form and sculpture of this species have a general resemblance to those of the preceding two species, although the color is wholly different and in the absence of the soft parts it is provisionally placed with them.

MANGILIA Risso.

Mangilia movilla Dall, n. sp.

Plate 14, figure 6.

Shell small, thin, white, fusiform, with about five whorls beside the (eroded) nucleus; suture distinct, slightly appressed; anal fasciole narrow, nearly smooth except for lines of growth, bordered in front by an inconspicuous angular shoulder; from this shoulder extend (on the last whorl about eighteen) feeble, narrow, subequal, protractive, axial riblets, with subequal interspaces, crossed by fine, close-set spiral threads; the ribs extend to the suture, or on the last whorl to the base, and the threads cover the whole surface; anal sulcus shallow, outer lip thin, simple, moderately arcuate; pillar and body smooth, the former obliquely attenuated in front, not pervious; canal short, wide, slightly recurved; Lon. of shell, 4.9; of aperture, 2.6; of last whorl, 3.7; max. diam. 2.0 mm.

U. S. S. "Albatross," station 3418, off Acapulco, in 660 fathoms, sand, bottom temperature 39°F. U. S. N. Mus. 123,118.

Mangilia cetolaca Dall, n. sp.

Aesopus oldroydi Arnold, Mem. Cal. Acad. Sci., 1903, **3**, p. 238, pl. **6**, fig. 7. Not *Mangilia oldroydi* Arnold, *op. cit.* p. 213.

Lower Pleistocene of San Pedro, California, Arnold.

Living at U. S. S. "Albatross," station 2835, at Ballenas Lagoon, Lower California (N. Lat. 26° 42′ 30″), in five and a half fathoms, temperature 56°F.

Mangilia enora Dall, n. sp.

Plate 4, figure 6.

Shell small, yellowish-white, decollate with about six whorls beside the (lost) nucleus, the spire longer than the aperture; suture distinct, not appressed, with a broad anal fasciole in front of it, arcuately sculptured by lunate wrinkles following the lines of growth and in the earlier whorls elevated into sharp wrinkles at regular intervals, which are carried more or less distinctly over the anterior part of the whorls; in front of the somewhat concave fasciole the whorls are rounded and spirally sculptured with numerous close, very fine, sharp, spiral threads which cover the whorl, becoming coarser, less regular, and less crowded toward the canal; aperture short, lunate; outer lip with a broad, deep, rounded, anal sulcus close to the suture, the lip in front of it thin, sharp, and strongly arcuately protractive; body smooth; pillar very short, smooth, obliquely truncate; the canal very short, deep, recurved, forming a marked siphonal fasciole; operculum absent. Lon. of shell, 9.5; of last whorl, 5.7; of aperture, 4.0; max. diam. 4.2 mm.

U. S. S. "Albatross," station 3376, off the coast of Ecuador, in 1132 fathoms, ooze, bottom temperature 36°.4 F. U. S. N. Mus. 123,121.

Mangilia? genilda Dall, n. sp.

Plate 13, figure 3.

Shell small, white, with about six whorls exclusive of the (lost) nucleus; suture distinct, the whorl in front of it slightly turgid, in front of which the anal fasciole is more or less constricted; at the shoulder begin about fifteen short, very obliquely protractive, wave-like ribs, with narrower interspaces, which are conspicuous only near the periphery; surface otherwise smooth except for faint incremental lines; aperture lunate; anal sulcus wide, shallow; outer lip sharp, thin, arcuately produced in front of the sulcus; body polished; pillar short, gyrate, not pervious, obliquely truncate in front; canal very short, wide, and slightly recurved. Lon. of shell, 10.5; of last whorl, 6.5; of aperture, 5.0; max. diam. 4.6. mm. Operculum none.

U. S. S. "Albatross," station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F. U. S. N. Mus. 123,131; and station 3393, in 1020 fathoms, mud, temperature 36°.8 F. U. S. N. Mus. 123,122.

This and the preceding species are not of the typical group of Mangilia, having more the profile of a Gemmula with a short canal, or a small, slender, high-spired Gymnobela, but they are left here for the present, pending a revision of the entire group.

Mangilia sedillina Dall, n. sp.

Plate 13, figure 8.

Shell small, translucent white, very thin, fusiform, the nucleus eroded, with four subsequent whorls; suture distinct, whorl in front of it with a narrow, thickened margin; whorls slightly angulated at the shoulder, the angle obsolete on the last whorl; axial sculpture, in addition to lines of growth of (on the penultimate whorl about twenty-six) fine, sharp, narrow lamellose riblets following the lines of growth, beading the presutural band, angulated at the shoulder and obsolete on the base, with wider, excavated interspaces; these are crossed by very numerous, fine, close-set, spiral threads, slightly coarser on the canal and minutely feebly reticulated by the incremental lines; body and pillar polished, the sculpture erased; outer lip thin, simple, with a wide sulcus occupying the space between the suture and the shoulder, in front of which it is arcuately protractive; pillar straight, simple, obliquely truncate in front; canal short, wide, not recurved. Operculum absent.

Variety with stronger sculpture, shorter and stouter shell, and distinctly recurved canal.

Lon. of (decollate) shell, 8.0; last whorl, 6.7; aperture, 5.0; max. diam. 4.0 mm. Same dimensions in the variety, 5.7, 4.5, 4.0, and 3.5 mm.

U. S. S. "Albatross," station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F. U. S. N. Mus. 123,116 and 123,116 *a*.

Mangilia encella Dall, n. sp.

Plate 14, figure 11.

Shell small, white, with a translucent thin periostracum and about five whorls (the nucleus eroded); spire slightly longer than the aperture; early whorls rounded with about fifteen slender, low, arcuate, protractive, axial riblets which are obsolete on the last whorl; suture distinct, marginate, where the riblets are conspicuous as at the periphery and continued to the suture in front; there are also fine, well-marked lines of growth, all crossed by close-set, low, spiral threads which become coarser and slightly more distinct on the canal; anal sulcus deep, wide, rounded, the outer lip in front of it strongly protractive, thin, simple; body and pillar with a thin wash of callus; the pillar straight, attenuated in front, aperture narrow and lunate, canal short, rather wide, not recurved. Lon. of shell, 11.25; of last whorl, 8.5; of aperture, 6.5; max. diam. 5.0 mm.

U. S. S. "Albatross," station 3366, off Cocos Island, in 1067 fathoms, ooze, bottom temperature 37° F. U. S. N. Mus. 123,113.

CLATHURELLA Carpenter, 1856.

Clathurella orariana Dall, n. sp.

Plate 14, figure 12.

Shell small, fusiform, white or pale yellowish, dull surfaced, with a nucleus (eroded) and about six subsequent whorls; suture distinct, not appressed; whorls rounded; anal fasciole smooth except for minute arcuate, elevated, more or less distant axial lines, and the intervening incremental lines; whorl in front of the fasciole axially sculptured with (on the last whorl about twenty-six) moderately strong, equal, rounded, somewhat protractive ribs with subequal interspaces, the ribs extending from the shoulder to the suture or, on the last whorl, to the base, where they become obsolete; these ribs are crossed on the spire by about six prominent spiral threads, subequal and with wider interspaces, often with a more minute intercalary thread, the primaries somewhat swollen on the summits of the ribs; on the last whorl the same sculpture extends over the whorl and upon the canal; outer lip thin, broadly arcuate, simple, with a rounded, shallow, anal sulcus close to the suture; body with a thin wash of callus, white and smooth; pillar straight, rapidly attenuated in front with a pervious axis; canal wide, slightly recurved. Lon. of shell, 12.0; of last whorl, 8.7; of aperture, 6.0; max. diam. 5.0 mm.

U. S. S. "Albatross," station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F. U. S. N. Mus. 123,117.

This species is not a typical Clathurella, but in the present confused state of the Turritidae no other group seems more appropriate, and it seems unsafe to apply a new sectional name to it until more is known.

Clathurella panamella Dall, n. sp.

Plate 14, figure 1.

Shell small, polished, white, with, on the last whorl and in the throat, a livid pinkish tint, ten-whorled; nucleus eroded, but with its first whorl flattish and appearing from above discoid and glassy; subsequent whorls glistening, constricted and appressed at the suture, with (on the penultimate whorl eighteen) arcuate and protractive axial ribs which extend from the suture to the canal except over the last half of the last whorl; the constriction which indicates the anal fasciole gives the posterior edge of the whorl a marginate appearance, but does not interrupt the ribs, which are very prominent in front of the fasciole at the shoulder; the whole surface is evenly sculptured by strongly incised, almost channelled lines, with wider, flat, strap-like interspaces; near the canal these become narrower and cord-like and the channels wider, diminishing again toward the end of the canal; the spiral sculpture does not nodulate the ribs, but is minutely crenulated on the eminences by fine, even, incremental lines; aperture short, wide, with a deep rounded anal sulcus next the suture, a thin and much produced outer lip, a short, slightly recurved, flaring canal, an arcuate callous pillar, white and smooth, with a conspicuous nodule on the body between the sulcus and the suture; operculum wanting. Lon., 14; of last whorl, 8; of aperture, 5.5; max. diam. 6 mm.

U. S. S. "Albatross," station 3391, in the Gulf of Panama, 153 fathoms, mud, bottom temperature 55°.8 F. U. S. N. Mus. 123,104.

The species was also dredged at station 2804, in Panama Bay, in 47 fathoms, mud, bottom temperature 64° F. U. S. N. Mus. 122,771.

The first half of the last whorl in the adult ends in a node or varix, indicating a previous resting stage with developed outer lip; beyond this the whorl is destitute of ribs.

Clathurella plicatella Dall, n. sp.

Shell very small, acute, eight-whorled, flesh color or pinkish white, polished: nucleus turbinate, blunt, polished, smooth, of about two whorls; subsequent whorls axially sculptured with (on the last whorl behind the node) ten sharp, more or less sigmoid, slightly protractive ribs extending from the suture to the canal, or on the spire from suture to suture, with wider interspaces; suture appressed; in front of it is a very slight constriction corresponding to an anal fasciole, though no actual fasciole is visible; aperture moderate, anal sulcus large for the size of the shell, rounded and deep; lip in front of it rounded and produced; on the body a small mass of callus limits the posterior edge of the sulcus; the body is smooth and callous, the enamel extending upon the pillar, which is short and attenuated; canal short, recurved, on the back finely, sharply, spirally striated, but these striae do not extend over the rotundity of the whorl. Length of shell, 7.0; of last whorl, 3.5; of aperture, 2.5; max. diam. 2.5 mm.

U. S. S. "Albatross," station 2799, in Panama Bay, in 29½ fathoms, mud.

This pretty little species is a typical Clathurella.

GLYPHOSTOMA Gabb.

Glyphostoma immaculata Dall, n. sp.

Plate 1, figure 9.

Shell small, white, with a faint brownish or pinkish flush on the last whorl brilliantly polished and with no perceptible periostracum or operculum; nucleus three-whorled, white, polished, with a peripheral carina on the third whorl which terminates abruptly; subsequent whorls four and a half, strongly sculptured; suture distinct, simple; whorls with 12–14 strong axial, slightly protractive ribs, faint on the anal fasciole, strong at the shoulder, and gradually attenuated over the base; these are crossed by (on the last whorl about fourteen) strong, subequal, equidistant channelled sulci, absent on the fasciole, obsolete in the depressions between the ribs, but cutting the summits of the ribs into squarish nodules; the fasciole is smooth and polished, but shows about four alternate opaque and translucent spiral bands of white, which at first look like threads; aperture narrow, anal sulcus strong, not deep, surrounded with a heavy callus; outer lip callous, forming a heavy varix, with six or seven internal lirae strongest and dentiform at the margin; body with a heavy and prominent anal callus separated by a gap from eight or nine dentiform lirae on the straight pillar; canal short, wide, at the anterior margin flaring. Lon. of shell, 10.4; of last whorl, 7.0; of aperture, 6.0; max. diam. 5.0 mm.

U. S. S. "Albatross," station 3391, Gulf of Panama, in 153 fathoms, mud, bottom temperature 55°.8 F. U. S. N. Mus. 123,115.

I do not feel certain that the existing nuclear shell is not an internal cast of a very thin, perhaps differently sculptured, larval shell, of which in one specimen I fancy traces are visible near the suture.

Glyphostoma thalassoma DALL, n. sp.

Shell slender, acute, eight-whorled, beside a nucleus of about a whorl and a half; the spire longer than the aperture, whorls gently rounded, suture appressed, not deep; axial sculpture of (on the penultimate whorl twenty-one) feeble, narrow, protractive ribs, concavely arcuate where they pass over the anal fasciole, and at the other end becoming obsolete on the base of the whorl, their interspaces narrower or subequal to the ribs; these are crossed by (between the sutures five or six, on the last whorl about eighteen) rounded, equal, strong spiral threads, with narrower interspaces, and hardly enlarged where they intersect the ribs; the anal fasciole is rather obscure and sculptured with incremental lines, and on the anterior edge about three very fine spiral threads; on the canal beyond the major threads are about fifteen minor spirals closely crowded; outer lip with a strong varix and conspicuous rounded anal sulcus, behind which on the body is an arcuate mass of callus; edge of the outer lip thin, strongly lirate within, the anterior margin denticulate; inner lip thinly callous, with a marginal row of small pustules opposite the lirae; canal constricted, deeply sulcate, somewhat recurved; shell discolored, probably originally whitish. Length of shell, 19.5; of last whorl, 12.0; of aperture, 9.0; max. diam. 6.5 mm.

U. S. S. "Albatross," station 3017, off Cape Lobos, Gulf of California, in 58 fathoms, mud, bottom temperature 61°.8 F. U. S. N. Mus. 110,612.

It is possible that, with greater age, the armature of the inner lip might be more conspicuous, as the shell may not be completely mature.

DAPHNELLA Hinds.

Daphnella (Eubela) imparella Dall, n. sp.

Plate 2, figure 2.

Shell small, translucent white, smooth, polished, very thin, with a three-whorled yellow nucleus of the "*Sinusigera*" type, ending abruptly; the form of the shell fusoid, whorls gently rounded, with about four whorls following the nucleus, marked only with lines of growth, obscure spiral markings, and on the canal a few obsolete spiral threads; suture distinct, not marginate; aperture lunate; anal sulcus very wide and shallow, outer lip thin, arcuately protractive; body smooth; pillar straight, obliquely truncate in front, hardly callous; canal wide, shallow, not recurved. Lon. of shell, 12.7; of last whorl, 9.0; of aperture, 7.0; max. diam. 5.5 mm.

U. S. S. "Albatross," station 3392, Gulf of Panama, on hard bottom, in 1270 fathoms, bottom temperature 36°.4 F. U. S. N. Mus. 123,114.

The species wants the sutural margination and beading of *Eubela limacina* Dall, of the Atlantic, and its proportions are different, but in other respects it is rather similar. This group has no operculum.

Daphnella (Surculina) blanda Dall, n. sp.

Plate 3, figure 1.

Shell elongate fusiform, thin, slender, of a pale buff color, eroded nucleus, and about six subsequent whorls; suture distinct, slightly appressed, whorl in front of it minutely arcuately axially wrinkled; nucleus and the following whorl and a half eroded, the next two or three whorls faintly axially ribbed with (on the third whorl about fifteen) low, rounded, narrow, subequal protractive riblets which on the following whorls weaken and disappear; the intervals are wider than the ribs, shallow, and crossed by (between the sutures 8–9) low, regular, equal, rounded spiral threads, equally distributed and not nodulous, but weaker or absent between the suture and shoulder where the ribs originate. On the last whorl the spiral sculpture is much the same except that the threads are flattened and strap-like and the interspaces more or less channelled and near the canal wider; outer lip arcuate, slightly excavated near the suture, protractive below, moderately constricted on the canal, thin, simple; pillar straight, rapidly attenuated forward, the edge gyrate and minutely pervious at the axis; canal long, straight, wide, obliquely truncated. Lon. of shell, 26.5; of last whorl, 20.0; of aperture, 16.5; max. diam. 8.0 mm.

U. S. S. "Albatross," station 3366, off Cocos Island, Gulf of Panama, in 1067 fathoms, ooze, bottom temperature 37° F. U. S. N. Mus. 123,119.

Daphnella (Surculina) cortezi Dall, n. sp.

Shell slender, chestnut brown fading to white or yellowish, fusiform, the spire shorter than the aperture, with more than five whorls; nucleus defective; somewhat constricted over the anal fasciole with an appressed suture, periphery moderately rounded; axial sculpture at the suture of small, little-raised folds, with wider interspaces, not surpassing the width of the fasciole; on the earlier whorls are small, feeble, narrow axial riblets extending to the suture (on the antepenultimate whorl fourteen), with wider interspaces and almost vertical; these are crossed by very numerous flat, strap-like spirals with narrower channelled interspaces somewhat unequal in width and covering the whole shell; the entire surface is also sculptured with a multitude of fine spiral striae; outer lip thin, hardly arcuate; inner lip smooth, the surface erased; pillar anteriorly rapidly attenuated; anal sulcus shallow and inconspicuous; canal long and wide. Length of (decollate 4½ whorled) shell, 39–43; of last whorl, 29–34; of aperture, 24–27; max. diam. about 14 mm.

U. S. S. "Albatross," station 2919, off Cortez Bank, in 984 fathoms, mud, bottom temperature 38° F. U. S. N. Mus. 110,613. Also off San Diego, Cal., at station 4353, in 639 fathoms, mud, bottom temperature 39°.

The second specimen fortunately contained the soft parts, which were of a brownish color, the foot broad and large; the animal contracted by alcohol shows no tentacles, eyes, or muzzle, the retractile proboscis is large and rather long. There is no operculum; the anterior margin of the foot is transversely truncate and duplex, or with a double edge, the two separated by a shallow sulcus; the gill and osphradium large and produced. The siphonal fold of the mantle is large, elongate and smooth-edged; the posterior end of the foot bluntly rounded, the upper surface of the foot strongly corrugated, with no trace of an opercular gland. The verge was retracted in a sigmoid curve, its form subcylindical near the base and gradually attenuating distally, the extreme tip papilliform, with no trace of an appendix.

It is of course possible that the typical species may differ anatomically from this one, but the shells are in general sufficiently similar to be provisionally associated. Whether they have anything to do with Daphnella is of course problematical, but that is the Mangilioid group they are least unlike.

The place of the two following species is also uncertain, nothing being known of the soft parts.

Clinura monochorda Dall, n. sp.

Plate 13, figure 1.

Shell small, white, biconic, with a very thin yellowish periostracum and six sharply angular whorls; nucleus eroded; suture distinct, not appressed; axial sculpture of (on the penultimate whorl thirteen, on the last whorl seventeen) sharp, narrow, nearly vertical ribs, with wider interspaces, arcuate and feeble above the periphery, where they form angular projections, obsolete on the last half of the last whorl, becoming obsolete midway between the periphery and the canal; the upper surface of the whorls flattish, sloping, with about fifteen fine, close, more or less alternated spiral threads; periphery with a strong projecting spiral keel more or less angulated by the ribs at their intersections; in front of the keel are about fifteen primary spiral ridges, low, with wider interspaces; both the ridges and the interspaces sculptured with finer subequal close secondary threads, except on the canal where they alternate; aperture elongate, angulated by the keel; anal sulcus wide, shallow; outer lip sharp, thin, crenulated by the spiral sculpture; body with a thin wash of callus; pillar straight, obliquely truncate in front; canal moderately long, rather wide and slightly flaring at the end; operculum none. Lon. of shell, 11.5; of last whorl, 8.0; of aperture, 6.2; max. diam. 6.5 mm.

U. S. S. "Albatross," station 3393, Gulf of Panama, in 1020 fathoms, mud, bottom temperature 36°.8 F. U. S. N. Mus. 123,130.

The shell is probably not fully grown, and the character of the aperture may be somewhat different at maturity.

Clinura peruviana Dall, n. sp.

Plate 13, figure 2.

Shell small, white, with a thin grayish periostracum and about five similarly sculptured whorls exclusive of the (lost) nucleus; axial sculpture of (on the last whorl thirteen) sharp, narrow, vertical ribs, feeble and concavely excavated between the suture and the keeled shoulder of the whorl, there prominently angular, beyond the shoulder vertical, becoming obsolete on the base; beside this the incremental lines are minutely elevated and rasp-like over the whole surface, but most so between the spirals; suture distinct, not appressed, the whorl between it and the shoulder descending and flattened, with five or six revolving fine threads and some secondary, finer intercalary threads; shoulder with a prominent, small, rounded keel, undulated by the ribs, beyond which similar spiral threads to the number of a dozen or more, with wider interspaces, to the canal; the first interspace has three equal fine intercalary threads, the second two, and the remainder one each, becoming gradually closer anteriorly; aperture rather narrow, the anal sulcus wide, shallow, extending from the shoulder to the suture; aperture angulated by the shoulder keel; outer lip thin, entire; body with a wash of callus, white, polished; pillar rapidly attenuated, straight, axis not pervious; canal narrow, straight. Lon. of shell, 9.0; of aperture, 5.2; of last whorl, 7.0; max. diam. 4.2 mm.

U. S. S. "Albatross," station 4654, 24 miles N. 68° W. from Point Aguja, Peru, in 1036 fathoms, mud, bottom temperature 37°.3 F. U. S. N. Mus. 110,564.

Cancellariidae.

CANCELLARIA Lamarck.

Type *Voluta reticulata* Linné.

Narona H. and A. Adams.

Type *C. mitraeformis* Sowerby, not Brocchi.

Cancellaria (Narona) exopleura Dall, n. sp.

Shell small, slender, acute, with five rounded whorls, a deep suture, a pilose periostracum, whitish more or less banded spirally with reddish brown; nucleus defective, but apparently glassy, bluntly pointed and with about two whorls; subsequent whorls with (on the antepenultimate whorl fourteen) narrow, sharp, low riblets, with wider interspaces, becoming relatively less prominent on the later whorls; these are crossed by from four to six narrow, subequal, distant, rounded spiral threads, not nodulous at the intersections; the last whorl is also furnished with two or three prominent varices, irregularly disposed, beside the terminal varix; these are thick and rounded; on the last whorl there are about fifteen feeble spirals and some intercalary finer threads appear; aperture slightly shorter than the spire, semilunate, the outer lip reflected and thickened, with 9–10 denticles internally, not continued into the throat; inner lip not callous; pillar with two strong distant plaits, the canal wide, produced and recurved; no operculum. Length of shell, 26; of the last whorl 18; of the aperture, 12.5; max. lat. 12 mm.

U. S. S. "Albatross," station 2804, in Panama Bay, in 47 fathoms, muddy bottom. U. S. N. Mus. 96,638. Also at Payta, Peru, Dr. Jones.

This is nearest to *C. clavatula* Sowerby, from the same region, which is a smaller shell, with one less whorl, with fewer ribs (ten on the antepenultimate whorl), which are rounded and much more prominent; the whorls in *C. clavatula* also increase more rapidly and have a tabulate aspect.

Cancellaria (Merica) corbicula Dall, n. sp.

Plate 1, figure 4.

Shell small, thin, milk-white, with a thin, pale yellow periostracum, and about six whorls beside the blunt (decollate) nucleus; form bulimoid, aperture nearly equal to the spire in length; whorls evenly rounded, with a strongly marked suture; sculpture between the sutures of seven to nine flattish revolving threads with slightly wider channelled interspaces; these are crossed by numerous, subequally spaced, very narrow, low, slightly arcuate axial ridges, slightly nodulous at the intersections; there are also very numerous, prominent, incremental lines in the interspaces; aperture oval, outer lip thin, smooth, entire, reflected; inner lip with a thin callous coat of enamel, continuous with the outer margins; pillar short, axis imperforate, with two strong oblique plaits near the proximal end of the pillar; canal obsolete. Length of shell, 21.5 (to 26.0); of last whorl, 16.0; of aperture, 10.5; max. diam. 9.5 mm.

U. S. S. "Albatross," station 2936, off San Diego, California, in 359 fathoms, mud, bottom temperature 49° F. Also at station 4382, in 656 fathoms, mud, temperature 42°.5; at station 4407, off Catalina Island, in 600 fathoms, sand, temperature 39°.4; and station 4425, in 1100 fathoms, mud, north of San Nicolas Island.

The figure of this pretty species was drawn from a rather small specimen. The type of the Merica group is *Cancellaria melanostoma* Sowerby.

Cancellaria (Merica) centrota Dall.

Plate 1, figure 8.

Cancellaria centrota Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 13.

Shell solid, short, ashy or pinkish white, with a smooth, small nucleus of two whorls, and five and a half strongly sculptured subsequent whorls; spire subtabulate, rather pointed; sculpture of five or six strong spiral threads, of which that at the shoulder is much the largest, crossed by (on the last whorl nine) sharp, recurved varices, spiny at the intersections in well-developed specimens, the spines at the shoulder much longer than the others, while in some depauperate specimens the only spines are at the shoulder; there is also some obscure spiral striation between the threads on the last whorl, and the lines of growth are irregular and often prominent; aperture subtriangular, with three strong plaits on the pillar, and, in fully adult shells, some faint liration inside the outer lip; canal short, distinct, forming a strong fasciole around a narrow, deep umbilicus, over which the inner lip is partly reflected; body with a wash of callus; throat whitish. Height of shell, 35; of last whorl, 25; of aperture, 18; width of shell exclusive of the spines, 20 mm.

U. S. S. "Albatross," station 3368, in 66 fathoms, rocky bottom, near Cocos Island, Gulf of Panama, temperature 58°.4 F. U. S. N. Mus. 122,996.

This is the most thorny species yet described.

Cancellaria (Merica) io Dall.

Plate 1, figure 2.

Cancellaria io Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 14.

Shell fusiform, solid, whitish or pink, with a more or less olivaceous epidermis, and about six whorls; spire pointed, whorls rounded, somewhat constricted in front of the suture, which is appressed; sculpture of numerous flattened spiral threads, with about equal interspaces, uniform over the whole surface, but with occasional finer intercalary threads; these are crossed by (on the last whorl about thirteen) rather stout, rounded ribs, strongest at the shoulder, obsolete beyond the periphery, and not reaching the suture behind them; aperture rather long, outer lip simple, smooth, not reflected or lirate; pillar rather straight, with three strong plaits; canal shallow, wide, pointed, making no perceptible fasciole; umbilicus none; body with a thin wash of callus. Height of shell, 43; of last whorl, 33; of aperture, 25; width of last whorl, 21 mm.

U. S. S. "Albatross," station 3354, in 322 fathoms, green mud, Gulf of Panama, bottom temperature 54°.1 F. U. S. N. Mus. 122,995.

This species has much the look of a gigantic Admete, but without the arched pillar. Most of the specimens were eroded, and the species has a genuine abyssal aspect.

Cancellaria (Merica?) microsoma Dall, n. sp.

Plate 11, figure 10.

Shell small, thin, covered with a pale brownish periostracum, with about five tabulate whorls beside the (lost) nucleus; suture distinct, not channelled; whorl in front of it flattened, beyond the keel at the shoulder moderately rounded; axial sculpture of lines of growth which are at intervals so prominent as to suggest faint ribs; spiral sculpture comprising a marked keel at the shoulder, minutely undulate by the axial riblets, and followed by a wide interval; about eight less prominent spiral threads, separated by successively narrower intervals with microscopic intercalary threads, covering the whole base; aperture ovate, outer lip thin, simple, sharp; body smooth; pillar straight, short, thin, with two plaits, the anterior of which forms the edge of the columella; anterior part of aperture with a distinct, but not deep, rounded notch. Lon. of shell, 3.5; of last whorl, 2.5; of aperture, 1.7; max. diam. 1.8 mm.

U. S. S. "Albatross," station 3418, off Acapulco, Mexico, in 660 fathoms, sand, bottom temperature 39° F. U. S. N. Mus. 122,997.

This small species might be referred to Admete were it not for the absence of the concave arcuation of the pillar which is characteristic of that genus, and the presence of a small umbilical chink.

Cancellaria (Admete?) californica Dall, n. sp.

Plate 4, figure 4.

Shell thin, turrited, with five whorls beside the nucleus, white, with a pale, olivaceous periostracum; nucleus blunt, turgid, of about a whorl and a half, smooth but not polished; subsequent whorls with a prominent angular shoulder, above which the whorl is tabulate, the angulation becoming obsolete in the last whorl of the adult shell; in the early whorls the space between the angle and the suture behind it is nearly smooth and flat, later it has faint spiral threads and becomes more convex; axial sculpture of numerous (on the penultimate whorl about twenty) low rounded ribs, with shallow, subequal interspaces, strongest at the angle, obsolete on the tabulation and on the last whorl, extending on the spire to the succeeding suture; the incremental lines are also rather conspicuous; spiral sculpture in front of the angle of (on the spire about four, on the last whorl about twenty) low rounded subequal spiral threads with wider interspaces, a little turgid where they cross the ribs, especially on the spire, and more crowded on the last whorl, anteriorly, where they extend to the brink of the umbilicus; aperture subtriangular, the outer lip thin, not reflected; body with a thin wash of callus; pillar thin, straight, with three plications, the middle one strongest; canal obsolete or none; umbilicus rather large, funicular, its walls vertically striate, the opening partly concealed by the pillar lip; in the young the umbilicus is relatively much smaller; operculum absent. Length of shell, 16; of last whorl, 11; of aperture, 8; max. diam. 8.3 mm. Length of figured specimen, 10 mm.

U. S. S. "Albatross," station 2980, in 603 fathoms, mud, bottom temperature 39° F. U. S. N. Mus. 110,626. Also at stations 3346, 3194, 2839, 2923, 2936, and 4339, from off Tillamook Bay, Oregon, south to the vicinity of San Diego, California, in from 92 to 786 fathoms, temperatures from 37°.3 to 49° F.

The specimen figured, from 2936, is about two-thirds grown; the others were discovered later. It does not show the third feeble plait, nor the somewhat sudden enlargement of the last whorl, both noticeable in the fully adult shell. It has the aspect of an Admete, in spite of the presence of an umbilicus, but is perhaps only a delicate form of Trigonostoma.

Volutidae.

CARICELLINAE.

ADELOMELON Dall.

Adelomelon Dall, Nautilus, April, 1906, **19**, p. 143; type *Voluta ancilla* Solander: Smithsonian Misc. Coll. Quarterly, 1907, **48**, p. 355.

In making a thorough and too long delayed examination of the systematic history of the Volutidae, in connection with a revision I have been making of the group, I discovered that the type of the genus Scaphella (under which I had formerly included the dull-colored American group of Volutes) is *V. undulata*, which belongs to the group of which Amoria Gray is a synonymic name; and the type of Cymbiola Swainson, which has been used for them by several authors, is *Voluta vespertilio* Linné. Both of these forms have a shelly protoconch, and belong to another subfamily. Scaphella has a peculiar brilliant surface enamel which no American Volute possesses, and a totally different radular dentition. It is obvious, therefore, that neither of these groups can properly contain the American shells which form an extremely natural group, and to which I have given the name of Adelomelon.

It may be well to recall here that the shell to which I originally gave the name of *Volutilithes philippiana*, which is an evident descendant of some of the Chilian and Patagonian Tertiary types, is now known to possess a membranous protoconch, and was referred by me, together with its fossil allies, to a section of Adelomelon under the name of Miomelon (Feb., 1907). Not aware of this fact, my friend, Dr. von Ihering of San Paulo, Brazil, in June of the same year, proposed for the same group of species the genus Proscaphella, with *P. gracilior* Ihering, as type. This is the *Voluta gracilis* of Philippi, not of Lamarck. While the sculpture of these species is rather characteristic, they are united with the Tertiary ancestors of the recent Adelomelon by somewhat intermediate gradations, and therefore I think that they can hardly be more than subgenerically separated from each other.[1]

Excepting *A. stearnsii* of Alaska, which perhaps reached American waters by ancestral emigration along the western shores of the Pacific, the most northerly species of Adelomelon is the following shell.

Adelomelon benthalis Dall.

Plate 5, figure 8.

Scaphella benthalis Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 13.
Adelomelon benthalis Dall, Smithsonian Misc. Coll. Quarterly, Feb., 1907, **48**, p. 357.

Shell recalling *A. magellanica*, Sowerby, but stouter, with more rounded whorls, the aperture shorter and wider, with a broad flexure where the lip turns to meet the body whorl, while in *A. magellanica* the posterior part of the aperture is pointed; the latter has two strong plaits on the pillar; *A. benthalis* has three, all obsolete, the middle one most perceptible, and has a less marked canal and siphonal fasciole. The interior of the aperture is pale flesh color; the exterior seems to have been like that of *A. magellanica*, but is almost entirely decorticated. It has five whorls beside the nucleus, and there is no operculum. Height, 125; of the last whorl, 90; of the aperture, 70; width of the aperture, 35; of the (decorticated) shell, 60 mm.

U. S. S. "Albatross," station 3360, in 1672 fathoms, sand, in the Gulf of Panama, temperature at bottom 42° F. U. S. N. Mus. 122,998.

At first sight one would be disposed to think that this specimen represented a northward extension by 3360 miles of one of the Magellanic species, but a more careful examination shows numerous points of difference.

The whorls are more nearly tabulate in front of the suture, the whorls rounder, the spire more rapidly tapering and relatively longer.

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[1] By the misplacement of some paragraphs in the paper above cited, the genus Zidona has been inserted in the text before, instead of after, the portion treating of Miomelon, *op. cit.*, p. 363–365.

TRACTOLIRA Dall.

Tractolira Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 12; Smithsonian Misc. Coll. Quarterly, Feb., 1907, **48**, part 3, p. 365.

Shell slender, drawn out in its coil, fusiform, with a short canal and pervious axis; outer lip simple, not expanded or lirate; body not callous, the axis twisted, with a single strong plait at its anterior edge, the young showing five or more narrow, low, thread-like ridges behind the one above mentioned, but which become obsolete in the adult.

This singular shell appears to be a degenerate abyssal form of Volutidae, but which can not be assigned to any of the genera yet established.

Type *T. sparta*, Dall.

The fossil *Voluta alta* Sowerby, of the South American Tertiaries, has the aspect of being a precursor of *T. sparta.*

Tractolira sparta Dall.

Plate 2, figure 7.

Tractolira sparta Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 13, Smithsonian Misc. Coll., 1907, **48**, p. 366.

Shell elongate, slender, with a greenish or ashy adherent epidermis (more or less eroded near the apex in all the specimens), and about six whorls; nucleus apparently as in Adelomelon, large, with an apical spur; whorls drawn out, rounded, with a distinct suture, the upper whorls at first smooth, then with irregular, partly obsolete, transverse wrinkles, some of which cross the whorl, but which are too irregular to call ribs; surface everywhere sculptured with numerous, even, fine, flattish spiral threads, with equal or slightly wider interspaces, and with well marked but not regular lines of growth; aperture subovate, rather wide in front, the outer lip simple and hardly thickened; the throat white, a thin wash of callus on the body, the pillar thin, pervious, short; the canal short and wide, with hardly any siphonal fasciole; operculum absent. Height of shell, 60; of last whorl, 43; of aperture, 28; diam. 19 mm.

U. S. S. "Albatross," stations 3360, 3374, 3414, and 3415, in 1672 to 2232 fathoms, mud, bottom temperatures 35°.8 to 36°.4 F.; Gulf of Panama to Acapulco, Mexico. U. S. N. Mus. 122,999.

This is a very characteristic and singular abyssal shell.

Ptychatractidae.

PTYCHATRACTUS Stimpson.

Ptychatractus californicus Dall, n. sp.

Shell small, fusiform, white, with a pale straw-colored periostracum and about five whorls; suture distinct, not appressed, whorls turgidly rounded; axial sculpture of (on the last whorl about fifteen) low rounded nearly vertical ribs, with about equal interspaces, which are strongest at the periphery and gradually become weaker in each direction, and obsolete on the base; the periostracum is vertically wrinkled, but the incremental lines are not conspicuous; spiral sculpture of (on the penultimate whorl six or seven, on the last whorl about twenty), flattish spiral threads with subequal or slightly narrower channelled interspaces, this sculpture extending to the tip of the canal; these threads override the ribs but without turgidity at the intersections; aperture elongate, ovate; outer lip simple, sharp, not reflected; inner lip not callous, pillar short, obliquely attenuated; canal short, recurved, narrow; on the pillar one feeble plait is visible at the aperture, further back there are two, and in the spire three with faint indications of a possible fourth plait, oblique and rather close together near the anterior edge of the pillar. Length of shell (nucleus defective), 11.0; of last whorl, 8.5; of aperture, 5.5; max. diam. 5.5 mm.

U. S. S. "Albatross," station 2923, off San Diego, California, in 822 fathoms, mud, bottom temperature 39° F. U. S. N. Mus. 193,650.

This little shell differs from the boreal *P. occidentalis* Stearns, and the *P. ligatus* Mighels, of New England in having axial ribbing and more than two plaits, as well as in its color. The operculum is ovate, concentric, and has an apical nucleus.

Fasciolariidae.

SOLENOSTEIRA Dall.

Solenosteira Dall, Trans. Wagner Inst., 1890, **3**, p. 122; type, *Pyrula anomala* Reeve, Conch. Icon., 1847, *Pyrula*, pl. **8**, fig. 12.

Solenosteira elegans Dall, n. sp.

Plate 5, figure 6.

Shell solid, large, white, with a somewhat villous olivaceous periostracum; short fusiform, with a nucleus of two and about five and a half subsequent, rapidly enlarging whorls; nucleus smooth, turgid, blunt; axial sculpture of (on the last whorl ten) strong, prominent, rounded, nearly vertical ribs, with wider interspaces, crossing the whorls, and faint incremental lines emphasized by prominences of the periostracum; spiral sculpture of (between the sutures three and on the last whorl six or seven) major prominent cords, between which are from three to seven finer threads, the former a little turgid where they override the ribs; suture distinct, deep, not appressed; aperture oval, outer lip sharp, not reflected, with about fifteen spiral lirae within, the anterior one largest; inner lip white, callous, with three or four faint subsutural lirae in the fully adult shell, otherwise quite smooth; canal short, wide, recurved; siphonal fasciole prominent; operculum ovate, with an apical acute nucleus, the area of adhesion quite small in proportion to the surface. Length of shell, 38; of last whorl, 29; of aperture, 22 mm.; max. diam. 22 mm.

U. S. S. "Albatross," station 3355, Gulf of Panama, in 182 fathoms, mud, bottom temperature 54°.1 F. U. S. N. Mus. 123,003.

This is perhaps the handsomest and most regularly sculptured species of this group.

FUSINUS Rafinesque.

Fusinus Rafinesque, Anal. de la Nature, 1815, p. 145; new name for *Fusus* Lamarck, preoccupied.

Fusus Bruguière, Encycl. Méth., 1789, p. 15 (nude name; not *Fusus* Helbling 1779); Lamarck Prodrome, p. 73, 1799; type *Murex colus* Linné.

Fusinus Dall, U. S. Geol. Survey, Professional Papers.

Fusinus panamensis Dall, n. sp.

Shell solid, white, covered with an olivaceous periostracum and about eight whorls (two or three at the apex defective in the specimen); axial sculpture of (on the apical whorls six, on the last whorl nine or ten) prominent rounded ribs with about equal interspaces; on the apical whorls these cross the whorl from suture to suture, but later become gradually more confined to the periphery, and on the last whorl show signs of obsolescence; these are crossed by numerous fine, sharp threads, slightly turgid where they cross the ribs, and with wider interspaces; the peripheral thread becomes more prominent, and on the last whorl or two almost becomes a keel from which the whorl slopes back to the suture in a flattish manner; the suture is distinctly appressed, not deep except near the apex; aperture rounded, white; the outer lip simple, not reflected, with a few spiral lirae in the throat which fall short of reaching the lip; inner lip with a thin callus with the edge raised anteriorly and faint indications of liration; canal constricted, long (in the specimen it has been broken and a new one formed with some distortion); operculum elongate, oval, with apical nucleus. Length of five whorls, 75; of last whorl, 55; of aperture without the canal, 21; max. diam. 26 mm.

U. S. S. "Albatross," station 3391, Gulf of Panama, in 153 fathoms, mud, bottom temperature 55°.8 F. U. S. N. Mus. 123,004.

A rather rude but very distinct species.

Fusinus fragillissimus Dall, n. sp.

Plate 12, figure 6.

Shell small, excessively thin and fragile with (more than) four rapidly enlarging whorls; shell substance chalky, yellowish white, with a pale olivaceous periostracum; suture very deep but not channelled, the whorl in front of it, for a small space, free from spiral sculpture; beyond this the sculpture consists of fine close-set spiral threads, of which some are a little larger than the rest, having from one to three of the smaller ones intercalated between them; there are about six of the larger ones between the sutures on the penultimate whorl; on the earliest remaining whorl there are six similar squarish threads with narrower channelled interspaces, and these are regularly reticulated by fine equidistant vertical elevated lines; on the later whorls there are only incremental lines of no great strength; base of the last whorl rather contracted; aperture ample, the outer lip thin, simple; a faint wash of callus on the inner lip; pillar slender, twisted, with a distinctly marginated edge and pervious axis; canal moderately long and wide, twisted and slightly recurved. Length of four whorls, 21; of last whorl, 14; max. diam. 8.5 mm.

U. S. S. "Albatross," station 3398, off the coast of Ecuador, in 1573 fathoms, ooze, bottom temperature 36° F. U. S. N. Mus. 123,007.

This is a very characteristic abyssal species and does not closely resemble any of those heretofore described.

Exilia Conrad.

Exilia Conrad, Journ. Acad. Nat. Sci. Phila., 1860, n. s., **4**, p. 291, pl. **47**, fig. 31; type *E. pergracilis* Conrad, l. c. Not *Exilia* Mulsant, 1863.

This shell was described from the Eocene of Alabama by Conrad, and appears to differ from Fusinus chiefly by its small size, delicate sculpture, and slender form. It has been stated to have a plicate pillar, but this is perhaps due to confusion with a species belonging to another genus, since the undoubtedly authentic specimens in the National Collection show not the slightest trace of any plication. The following species recalls Exilia in many particulars and might perhaps be appropriately referred to this subgenus.

Fusinus (Exilia?) rufocaudatus Dall.

Plate 3, figure 3.

Fusus rufocaudatus Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 12.

Shell elongate, acute, thin, with six or more whorls (partly eroded) covered with a delicate yellow-brown epidermis, the pillar and canal, when fresh, of a pronounced rufous-brown or brown-pink, which fades more or less in the dry shell; whorls drawn out, rounded, with a deep but not channelled suture; nucleus eroded; the remaining whorls sculptured with about a dozen flattened subequal spirals with narrower grooves between them, crossed by lines of growth and (on the last whorl about twenty) sharp flexuous riblets, which cross the whorl and are obsolete on the canal; base attenuated; pillar long, very straight, attenuated, twisted, almost pervious; aperture narrow; outer lip very thin, sharp, concave near the shoulder, produced in front, modified by the sculpture, but not lirate. Height of (eroded) shell, 30; of last whorl, 21; diam. 9 mm.

U. S. S. "Albatross," stations 3360, 3374, 3392, and 3415, in 1270 to 1879 fathoms, Gulf of Panama to Acapulco, sandy or oozy bottom, temperatures 36°.0 to 36°.4 F. U. S. N. Mus. 123,006.

This elegant little shell recalls Boreotrophon in its sculpture. The spirals in some of the specimens are narrower and more numerous than in the type, and in the young the ribs are less sharp and the color more ashy.

TROSCHELIA Mörch.

Troschelia Mörch, Journ. de Conchyl., 1876, **24**, p. 370; type, *Fusus berniciensis* King. Not *Troschelia* Duncan, Echinidae, 1883.

Boreofusus G. O. Sars, Moll. Reg. Arct. Norv., 1878, p. 278; type, *B. berniciensis* King.

Shell elongate, fusiform, with a produced recurved canal, a short, rounded-triangular operculum with apical nucleus, slightly sinistrally curved; the radular formula $\frac{1}{10}+\frac{1}{1}+\frac{1}{10}$, the cusp of the rhachidian plate well developed, nearly as long as the base; animal having the eyes developed.

Thalassoplanes Dall, subg. nov.

Shell short, the canal very short, the operculum straight, elongate, wedge-shaped, the extreme apex slightly turned to the right; radula (of the type) with the formula $\frac{1}{6}+\frac{1}{0}+\frac{1}{6}$, the rhachidian plate with the cusp obsolete; animal blind, male with a small, subcylindric verge, without appendices. Type *T. mörchii* Dall.

Troschelia (Thalassoplanes) mörchii Dall, n. sp.

Shell short, stout, with about five whorls, of which two are nuclear, polished, depressed, smooth; subsequent whorls uniformly sculptured with (between the sutures seven, on the last whorl nine or ten) narrow, similar, flat-topped, elevated ridges, with much wider, equal interspaces, and on the canal seven additional spiral threads; this sculpture is crossed by numerous (three or four to a millimeter) equal and equally spaced, flexuous, smaller elevated axial threads, which override the ridges and divide the channels into rectangular spaces; the whole is covered by a fibrous, thin, olivaceous periostracum; suture distinct, not channelled; whorls turgid and evenly rounded; aperture nearly equal to the spire, outer lip thin, sharp (in the adult reflected?), body and inner lip slightly erased, white; pillar short, twisted, its anterior edge thickened and flaring anteriorly, obliquely attenuated; axis pervious; canal almost obsolete, with no siphonal fasciole; operculum thin, brownish, pinna-shaped, the area of attachment small, rounded, surrounded by a thick deposit of polished brown callus which extends nearly to the apex. Lon. of shell, 16.0; of last whorl, 12.0; of aperture, 8.0; of operculum, 7.5; lat. of shell, 11.0; of operculum, 3.2 mm.

U. S. S. "Albatross," station 3684, in Mid Pacific, N. Latitude 0° 50′, W. Longitude 137° 54′, in 2463 fathoms, ooze, bottom temperature 35°F. U. S. N. Mus. 110,750.

It is extremely unusual to find a dextral shell with a dextrally curved operculum, and it is possible this feature may prove to be an individual abnormality.

The animal is blind, with a retractile proboscis and no muzzle; small, rounded, blunt tentacles (in alcohol); a small, not twisted or recurved, subcylindric verge with no appendages; the siphonal fold is also simple; the foot is short and bluntly pointed behind; in alcohol, strongly contracted, the surface was coarsely wrinkled and of a whitish color.

Two Antarctic species dredged by the "Challenger" between Marion Island and the Crozets appear to belong to this subgenus. They are *Fusus* (*Neptunea*) *calathiscus* and *F.* (*N.*) *setosus* of Watson. In looking over the other reports of deep-sea work I do not find any others which can, with probability, be referred to this group. Watson's supposition that his species might belong to Buccinopsis (= Liomesus), though having some ground in the conchological features and operculum, is negatived by the fuller information now supplied.

Buccinidae.

TRUNCARIA ADAMS AND REEVE.

Truncaria Adams and Reeve, Voy. Samarang, Zool. Moll., 1850, p. 33 (type *Buccinum filosum* Ads. and Rve. *op. cit.* pl. **11**, fig. 18); H. and A. Adams, Gen. Rec. Moll., 1853, **1**, p. 111, (*ex parte*); H. Adams, in Carpenter, P. Z. S., London, 1863, p. 344; Tryon, Man. Conch., 1882, **4**, p. 8.

Of the species referred to this genus in the Genera of Recent Mollusca only one, the type, really belongs to it, as was recognized by Henry Adams, according to Carpenter, in 1863. This came from the China Sea. I now have the pleasure of adding a second species, and of completing the diagnosis of the hard parts, by the information that the operculum is narrow, elongate-oval, concentric, with the nucleus apical.

Truncaria brunneocincta DALL.

Plate 2, figure 6.

Cominella brunneocincta Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 11.

Shell compact, solid, livid pinkish, with narrow, brown, distant, spiral lines and a few brown flammules near the suture; nucleus smooth, small, white, of two whorls, followed by five subsequent whorls; spire acute, whorls moderately rounded, the last much the largest; sculpture on the early whorls decussate by fine transverse riblets, strongest near the suture, and flattish spiral threading; later the whorls are polished, smooth, except for lines of growth and narrow, distant, sharp grooves; suture with a narrow channel; aperture long, narrow, with a shallow narrow sinus behind and a deep siphonal sulcus in front; outer lip thickened, flexuous, obscurely lirate behind, body with a thin callus; pillar white, concave, with a prominent margin, shorter than the aperture. Operculum narrow, elongate-oval, with an apical nucleus. Height of shell, 31.5; of last whorl, 24.5; diameter, 13.0 mm.

U. S. S. "Albatross," station 3390, in the Gulf of Panama, in 56 fathoms, sand, temperature 62°.6. U. S. N. Mus. 122,009.

Owing to the fact that the accessible species referred to Truncaria were all generically different from the present shell, and the original type unknown to me, this species was provisionally referred to Cominella in my preliminary diagnosis. Further study led to the discovery of its true relations.

VOLUTOPSIUS Mörch.

Volutopsius? amabilis Dall, n. sp.

Plate 11, figure 9.

Shell decollate, subcylindric, with an apparently blunt spire, whitish, with pale-brown, dull periostracum, and about four whorls, exclusive of the lost nucleus; suture distinct, not channelled, the whorl slightly constricted in front of it; axial sculpture only of faint lines of growth; spiral sculpture of (on the penultimate whorl about seven) weak, narrow, channelled, incised lines, with flat, wider interspaces and a still wider, smooth space between the first channel and the suture; the interspaces are narrower and somewhat rounded near the canal; aperture lunate, outer lip somewhat varicose, simple, entire, vertical; body with a smooth callus extending on to the short, slightly twisted pillar; canal very short, wide, not constricted; operculum short, ovate, with the nucleus near but within the apical margin. Lon. of last two whorls, 10.5; of last whorl, 8.5; of aperture, 6.0; max. diam. 5.2 mm.

U. S. S. "Albatross," station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F. U. S. N. Mus. 123,008.

This curious little shell is too imperfect for final decision as to its place in the system. It has a distant resemblance to Truncaria, but the form of the operculum, as well as the peculiar blunt spire, remove it from that genus. It resembles as much as anything the young shell of a species of Beringius. The operculum is not Columbelloid or Purpuroid.

PHOS Montfort.

Phos cocosensis Dall.

Plate 8, figure 5.

Phos cocosensis Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 11.

Shell elongate, acute, eleven-whorled, including a nucleus of four whorls; color yellowish-white, with variable brown spiral banding; sculpture of eleven or twelve narrow, little elevated, distant ribs, more or less angulated at the shoulder; spiral sculpture of numerous rather sharp, close threads, flatter on the last whorl, with a few more prominent between the suture and the shoulder; suture distinct, whorls moderately rounded; aperture longer than wide, with an entire outer lip, slightly thickened and internally lirate; throat white, pillar with a groove near its anterior edge; canal short, deep; siphonal fasciole moderate; body with a thin white callus. Height, 47; last whorl, 28; diam. 19 mm.

The operculum is smooth-edged, nearly as in *Fusinus*, with apical nucleus.

U. S. S. "Albatross," station 3368, near Cocos Island, Gulf of Panama, in 66 fathoms, rocky bottom, temperature 58°.4 F. U. S. N. Mus. 123,010. Also at station 3387, in 127 fathoms, sand, bottom temperature 56°.2 F.

This species is nearest to *Phos beaui* Crosse and Fischer, of the West Indies, but is larger and further differs by the strong and regular ribs.

Alectrionidae.

ALECTRION Montfort.

Alectrion Montfort, Conchyl. Syst., 1810, **2**, p. 565; type, *Buccinum papillosum* Linné.

Nassa Lamarck, Prodrome, 1799, p. 71; type, *Buccinum mutabile* Linné; not *Nassa* Bolten, Mus. Bolt., 1798, p. 132 (= *Purpura* Lamarck, 1799, not Martyn, 1784).

Hima (Leach) Gray, 1847, Moll. Gt. Brit., 1852, p. 123; type, *Nassa incrassata* Lamarck.

Tritia Risso, Hist. Eur. Mérid., 1826, **4**, p. 172, note; Gray, P. Z. S., 1847, p. 139; type, *Buccinum reticulatum* Linné.

Tritonella A. Adams, 1853, not Swainson, 1840.

Hima Leach.

Shell reticulate, with a callus on the inner lip; the outer lip varicose and internally lirate or denticulate.

Alectrion (Hima) catallus Dall, n. sp.

Plate 11, figure 11.

Shell short, solid, acute-conic, pale brown, with a tendency to darker bands, whorls eight and a half, of which three and a half are nuclear, rapidly increasing, sharply reticulately sculptured; suture very distinct, deep but not channelled; nucleus as in the next species, and the character of the sculpture similar to that species, but closer and finer; on the last whorl are about twenty axial riblets continuing over the wherl from the suture to the siphonal fasciole; on the spire between sutures six, and on the last whorl sixteen strap-like spirals; aperture rounded-quadrate; outer lip with a strong varix, inside of which about nineteen fine elevated lirae extend into the throat; body with a thick whitish callus and a low, rather distant subsutural ridge; pillar short, arcuate, smooth, with one or two elongate pustules near the anterior obliquely truncate edge which bears a strong keel; canal very short, contracted, strongly recurved, with a longitudinally striate siphonal fasciole, behind which, separating it from the base of the whorl, is a deep sulcus. Lon. of shell, 14.0; of last whorl, 9.5; of aperture, 6.0; max. diam. 8.5 mm.

U. S. S. "Albatross," station 3355, Gulf of Panama, in 182 fathoms, mud, bottom temperature 54°.1 F. U. S. N. Mus. 123,013.

A very compact and elegantly sculptured shell of the group to which the *A. ambigua* Montagu belongs, but, like most of the non-littoral species, of a more earthy and less porcellanous consistency. The nucleus is of about the same character as in the species from moderate depths.

Alectrion (Hima) miser Dall, n. sp.

Plate 4, figure 1.

Shell of moderate size, pale straw-color, with a smooth polished nucleus having a very minute swollen apex and three and a half rapidly enlarging rounded whorls followed by an abrupt change to the adult sculpture, which is borne by about five and a half subsequent whorls; shell solid, strongly reticulately sculptured; suture distinct, not channelled; axial sculpture of (on the last whorl about twenty) narrow rounded ribs, extending completely over the whorl, with slightly wider interspaces and fairly distinct lines of growth; spiral sculpture of (between the sutures four and on the last whorl seven) flat, strap-like, elevated bands which override the ribs and are about equally elevated in the interspaces as on the summits, where on the earlier whorls at the intersections, the intersections are very slightly swollen; between the anterior spiral and the siphonal fasciole is a wider sulcus; aperture subquadrate; outer lip somewhat varicose, thick, with, in the adult, eight strong spiral lirae, extending into the throat; body with a thin layer of callus and a faint subsutural ridge; pillar very short, concave, smooth, callous, with a strong keel just behind its anterior, obliquely truncate edge; axis not pervious; canal short, wide, shallow, with a strong, conspicuously wrinkled siphonal fasciole. Lon. of shell, 20.0; of last whorl, 13.5; of aperture, 9.0; max. diam. 11.5 mm.

U. S. S. "Albatross," station 3355, Gulf of Panama, in 182 fathoms, mud, bottom temperature 54°.1 F. U. S. N. Mus. 123,014. Also at stations 3354, 3387, 3389, 3391, 3396, and 3422, in 141 to 322 fathoms, mud or sand, bottom temperatures from 46° to 56°.2 F., the range extending from the Gulf of Panama to the vicinity of Acapulco, Mexico.

Alectrion (Tritia) exsarcus Dall, n. sp.

Plate 11, figure 12.

Shell small and rather slender, with three and a half nuclear and the same number (or more) of subsequent whorls; color pale yellowish with two pale, reddish brown, narrow bands, so applied that when the suture is formed there is a brown band near and on each side of it; nucleus large, the visible portion having a turbinate aspect, smooth and polished; subsequent whorls reticulated, with a distinct but not channelled suture; axial sculpture of (on the last whorl sixteen) strong, vertical, rounded ribs, which entirely cross the whorls and have a particular prominence (ill-defined) just in front of the suture; lines of growth feeble, surface polished, periostracum thin, yellowish; these ribs are crossed by (on the penultimate whorl five or six, on the last whorl fourteen) strong, rounded, somewhat flattened spiral threads, of which the second in front of the suture is a trifle larger than the others and may be articulated with brown and white; these threads are not nodulous, but become a little turgid when they cross the ribs, and are separated by subequal, or, on the base, slightly wider flattish interspaces; aperture ovate, the outer lip thin (possibly when older varicose?), with eight or nine lirae internally; inner lip with a thin, smooth coat of callus; pillar short, its anterior margin keeled and twisted; canal short, recurved, proximally constricted; siphonal fasciole distinct, with a strong keel behind. Length of shell, 9.0; of last whorl 5.5; of aperture, 3.25; max. diam. 4.5 mm.

U. S. S. "Albatross," station 4642, near the Galapagos Islands, in 200 fathoms, ooze, bottom temperature 48°.6 F. U. S. N. Mus. 110,565.

The operculum is normally nassoid. With this specimen were dredged some gorgonian cores supporting rows of nassoid ovicapsules probably belonging to this species. They are spatuliform, flat, with a small peduncle, the sides channelled, the lateral and upper edges projecting and, above, somewhat wavy or denticulate. They were about a millimeter and a half in height and somewhat less in width.

Alectrion (Tritia?) goniopleura Dall, n. sp.

Shell small, decollate, immature, comprising three whorls, rather rapidly enlarging, straw-color, with a slight brown band at the shoulder; suture deep, not channelled; sculpture of about ten narrow, prominent ribs, subspinose at the shoulder, crossing the whorls, and separated by much wider interspaces; these are crossed between the sutures by four, and on the last whorl by about fifteen low, rather obscure, strap-like flattened ridges, with narrower interspaces, not nodulous where they cross the ribs; those on the base smaller and closer together; aperture wide, pillar short, twisted, keeled at the anterior edge; inner lip with a thin layer of smooth callus. Length of three whorls, 5.5; max. diam. 4.0 mm.

U. S. S. "Albatross," station 4641, near the Galapagos Islands, in 633 fathoms, ooze, bottom temperature 39°.5 F. U. S. N. Mus. 110,630.

Although this specimen is quite defective, enough of it remains to characterize the species, and to distinguish it from any other forms of the genus known from the region. In form the species is not unlike *Nassa ephamilla* Watson, but the sculpture is different and there is only one row of spines or pointed nodules.

Columbellidae.

COLUMBELLA Lamarck.

Columbella (Anachis) fusidens Dall, n. sp.

Plate 11, figure 13.

Shell of moderate size, slender, acute, of a pale brown or brownish white, with a thin, smooth periostracum; whorls five and a half without the (lost) nucleus; suture distinct, not deep; axial sculpture of (on the last whorl thirteen) narrow, rounded nearly vertical ribs with subequal interspaces extending from suture to suture and on the last whorl to the base; spiral sculpture none above, obsolete on the base, a few strong threads on the canal and finer ones on the siphonal fasciole; aperture narrow, contracted; outer lip slightly thickened, within it and parallel to the edge is a ridge of callus more or less continuous and striated so as to appear as if composed of five or six fused denticles; in the type specimen this ridge is broken into two parts, the shorter anterior; in other specimens it is continuous; body and pillar with a rather thick layer of callus, obsoletely transversely striated, in some specimens possibly dentate, its outer anterior edge slightly raised; pillar nearly straight, canal very short, slightly recurved. Lon. of shell (without the nucleus), 15.0; of last whorl, 10.0; of aperture, 7.0; max. diam. 6.0 mm.

U. S. S. "Albatross," station 4642, four miles east of Ripple Point, Hood Island, Galapagos Islands, in 300 fathoms, globigerina ooze, bottom temperature 48°.6 F. U. S. N. Mus. 110,616.

The most striking characteristic of the species is the contracted mouth, with the internal denticles as if melted together. There is nothing which closely resembles it known from the region. *C. iodostoma* Gaskoin, from the Indo-Pacific region, is somewhat similarly contracted.

Columbella (Astyris) sp. indet.

A dead and mutilated specimen of an unusually large Astyris, recalling *Astyris saintpairiana* Caillet, of the Lesser Antilles, but more solid and with a wider apical angle. The outer lip is broken off, leaving only a trace of its presence near the subsutural callus. There were about six whorls, smooth, except that the apical ones show faint traces of fine low ribbing. ' The pillar is short and straight, not markedly recurved as in *Strombina*. The somewhat defective shell is 23 mm. long, the last whorl 16, and the aperture 11, while the maximum diameter is (at the suture of the last whorl) 9.5 mm.

U. S. S. "Albatross," station 3370, near Cocos Island, in 134 fathoms, mud, bottom temperature 54°.8 F. U. S. N. Mus. 106,889.

This species, when intact, must very nearly be the largest species known of Astyris.

STROMBINA Mörch.

Strombina edentula Dall, n. sp.

Shell large, smooth, ten-whorled, whitish with obscure brown cloudings and an ill-defined peripheral pale band, all covered by a smooth, pale yellowish periostracum; spire acute, a little shorter than the aperture; suture distinct, not appressed; nucleus small and smooth, of about two whorls; succeeding four apical whorls axially ribbed with fourteen or fifteen small, rounded, smooth, nearly vertical ribs, crossing the whorls, with subequal interspaces; these ribs become obsolete on the next, and are wholly absent from the later whorls which for axial sculpture have only incremental lines, and a single, stout, rounded, not distorted varix behind the outer lip; spiral sculpture only on the base and canal, at first faint, but growing strong anteriorly to the end of the canal; whorls moderately rounded, on the spire rather flattish; aperture elongate, narrow; outer lip thickened but not reflected; internally, perfectly smooth and white, without liration or denticulation of any sort; inner lip with a moderate layer of callus, continuous with that of the outer lip; subsutural ridge on the body rather distant from the posterior commissure of the aperture; pillar long, callous, thickened but not plaited at the anterior edge; canal short, wide, strongly recurved; operculum narrow, ovate, with apical nucleus. Lon. of shell, 34; of last whorl, 24; of aperture, 19; max. diam. 13.5 mm.

U. S. S. "Albatross," station 2830, northwest from Cape St. Lucas, on the outer shore of the Peninsula of Lower California, in 66 fathoms, sand, bottom temperature 74°.1 F. U. S. N. Mus. 96,578.

This is one of the largest species and different from most of the others in having no hump or distortion of the last whorl, and no teeth inside the inner lip or on the pillar. It differs from *S. turrita* Sowerby, its nearest relative, by its shorter and apically ribbed spire, its wider, last whorl, and less emphatic channelling of the aperture behind. Also, probably, in the slight tabulation of the whorl for a narrow space just in front of the suture.

The operculum is typically Columbelloid, having an ovate margin of polished callus with a narrow ray of callus projecting across the centre of the scar of adhesion. The animal is whitish with a reddish-brown margin to the mantle; the tentacles are rather short and stout, with the eyes on short, separate pedicels just outside the tentacles; the proboscis wholly retractile, the foot large, voluminous, solid, with wrinkled surface and an apparently rather blunt posterior extremity.

Muricidae.

PURPURINAE.

THAIS Bolten.

(= Purpura Lamarck, 1799, not Martyn, 1784.)

Thais nesiotes Dall, n. sp.

Shell small, purple-brown, bleaching to a purplish-white, with four smooth, minute dark brown nuclear whorls and about four subsequent whorls; suture appressed with a slight ridge, followed by a slight constriction, in front of it; aperture longer than the spire, which is acute; whorls moderately rounded; spiral sculpture of numerous flattish major spiral ridges, sometimes striated or even duplex, with narrower channelled interspaces usually with a small intercalary thread; on the penultimate whorl there are five or six major spirals between the sutures and on the last whorl about fourteen; these are crossed by very numerous slightly elevated lamellae, which in well preserved specimens imbricate the interspaces and rise a little higher at the suture; aperture semilunate, narrow behind; outer lip more or less thickened, white, and obscurely dentate within; columella broad with a flattened white callosity; pillar short, straight; canal very short and narrow, but having a strong siphonal fasciole with a closed chink behind the columellar callus. Lon. of shell, 18; of last whorl, 15; of aperture, 11; max. diam. 10.5 mm.

Collected on the shore at Easter Island by the "Albatross" party. U. S. N. Mus. 110,766.

A thorough search has failed to reveal this little species anywhere among the described species of Purpura. The specimens are possibly not quite mature.

MURICINAE.

TROPHON Montfort.

Trophon (Pascula) citricus Dall, n. sp.

Shell small, fusiform, acute, the spire longer than the aperture, livid flesh color with orange knobs and aperture, and about six whorls; apex rather acute, but in all the specimens overgrown with nullipore, etc., or eroded so as to be inaccesble; whorls moderately rounded, suture appressed; axial sculpture of, on the last whorl, about ten, inconspicuous vertical ribs, which bear, near the suture, a feeble spiral row, at the shoulder a very conspicuous row, and on the body of the last whorl three less conspicuous rows, of smooth, more or less orange-tinted, rounded, prominent nodules; between the spiral rows of nodules there are four or five equal and equidistant fine spiral striae; the surface of the shell is subtranslucent, recalling that of *Purpura lapillus* L.; aperture ovate, in the adult minutely channelled behind, glazed with a rich orange enamel, contracted sharply at the beginning of the canal; outer lip not reflected, thin-edged, with an internal thickening which is faintly lirate; body with a broad layer of callus, of which the left hand or outer border is a little raised; a small subsutural nodule in the adult and one on each side the entrance to the canal; pillar short, canal very short, deep, and strongly recurved, making a very prominent siphonal fasciole with a constriction behind it, and deep umbilical chink between it and the reflected edge of the columellar callus. Lon. of shell, 15.5; of last whorl, 10.0; of aperture and canal, 7.0; max. diam. 6.5 mm.

Collected by the "Albatross" party on the reefs at Easter Island. U. S. N. Mus. 110,767.

This shell is not an Aspella, as it wants the peculiar chalky surface of that genus and has a totally different sculpture; but I am unable to suggest any group which seems more similar.

The radula is most like that of *Trophon clathratus* as figured by Troschel, Gebiss der Schnecken, **2**, pl. **11**, figure 17, but differs in having the outer cusps of the rhachidian tooth nearer the outer ends of the basal plate, straighter, and the central cusp of the same tooth longer and more prominent. The laterals have also longer and stronger cusps, though of the same general shape.

The upper surface of the mouth is covered by a thin, smooth layer of chitine, while the anterior margin of the layer is modified into an evenly arched thickened narrow ridge performing the office of a jaw, with the middle part sculptured with many minute spicules or projecting needle-like spines.

The operculum is more or less lozenge-shaped, purpuroid, with a marginal coating of reddish brown enamel on the inner face.

The tentacles were slender and small and the eyes present, though details could hardly be had since the data were obtained from a soaked-out specimen which had been dried in the shell.

The shell is not a Trophon or Boreotrophon in the strict sense; in conchological and opercular characters it differs from Aspella; it cannot be referred to Purpura (= Thais) or Murex, and I am therefore constrained to propose a new sectional name for it with the following characters:

Shell small, with nodular sculpture; the aperture with a projecting margin, feebly lirate within the outer lip when adult, constricted in front at the beginning of the canal; dentition like Boreotrophon; operculum purpuroid, lozenge-shaped, with a raised border on the inside face; mouth provided with an arcuate chitinous jaw.

MUREX Linné.

Murex (Alipurpura) centrifuga Hinds.

Murex centrifuga Hinds, Zoöl. Voy. Sulphur, Moll., 1844, p. 8, pl. **3**. figs. 7, 8.

West coast of Veragua in fifty-two fathoms, sand, Hinds; U. S. S. "Albatross," station 3391, Gulf of Panama, in 153 fathoms, mud, bottom temperature 55°.8 F. U. S. N. Mus. 123,019.

The operculum is concentric with the nucleus a little above and to the right of the apex. It has no Purpuroid markings on the reverse side.

Murex (Phyllonotus) humilis Broderip.

Murex humilis Broderip, P. Z. S. Lond., 1832, p. 176; Reeve, Conch. Icon., 1845, **3**, Murex, pl. **13**, fig. 50 b.

St. Elena, west coast of Nicaragua, Cuming; U. S. S. "Albatross," station 2798, in Panama Bay, in 18 fathoms, sand. U. S. N. Mus. 110,615. Also on the beach of Perico Island, Panama Bay.

Tritonalia Fleming.

Tritonalia Fleming, Hist. Brit. An., 1828, p. 567 (in corrigenda); type, *Murex erinaceus* Linné.

Ocenebra (Leach MS.) Gray, Ann. Mag. N. Hist., 1847, **20**, p. 269; Gray, P. Z. S. Lond., 1847, p. 133 No. 10; same type.

Ocinebra H. and A. Adams, Gen. Rec. Moll., 1853, **1**, p. 74; Fischer, Man. de Conchyl., 1883, p. 642.

It is somewhat surprising that, notwithstanding the above names and dates have been frequently cited, Fleming's name, twenty years prior to the publication of Leach, has been ignored.

Murex (Tritonalia) diomedaeus Dall, n. sp.

Plate 12, figures 4, 5.

Shell small, reddish brown with (on the last whorl four, on the antepenultimate whorl five) spinose varices and about seven whorls, of which nearly three are nuclear and defective; spire subtabulate with two strong, rounded revolving ridges, the posterior larger and forming the shoulder, and at the varices forming a long, anteriorly guttered and longitudinally anteriorly lamellose, posteriorly imbricately longitudinally laterally threaded, recurved spine; on the body between varices there are three or four other similar ridges, smooth, except for very fine revolving striae, and ending in similar but shorter spines, in front of which, on the canal, are two smaller, narrower, and more simple spines; aperture ovate with a projecting, simple margin, not adherent on the side of the body; the outer lip with five notches due to the spiral ridges; interior without lirae; canal elongated, recurved, nearly closed. Lon. of shell, 29; of last whorl, 24; of aperture, 8; max. diam. of whorl, 15; including spines, 19 mm.

U. S. S. "Albatross," station 3397, Gulf of Panama, in 85 fathoms, mud, bottom temperature 57°.3 F. U. S. N. Mus. 123,020.

This shell has the characteristics of the Mediterranean species *Tritonalia erinacea* Linné, but is smaller, with more slender form and fewer and less strongly striated spirals.

TYPHIS Montfort.

Typhis martyria Dall.

Plate 15, figure 11.

Typhis martyria Dall, Proc. U. S. Nat. Mus., 1902, **24**, p. 550.

U. S. S. "Albatross," station 3013, off the island of San Pedro Martir, Gulf of California, in 14 fathoms, sand, bottom temperature 65° F. U. S. N. Mus. 130,629.

ANTISTREPTUS Dall.

Antistreptus Dall, Proc. U. S. Nat. Mus., 1902, **24**, p. 532; type, *A. magellanicus* Dall.
Glypteuthria Strebel, Zool. Jahrb., 1905, **22**, heft **6**, p. 627; type, *Euthria meridionalis* E. A. Smith.

This genus was originally described as sinistral, the type being left-handed in its spiral, but the excellent figures given by Strebel in his most useful work on the Magellanic fauna show that there are also dextral species. Thus, like Antiplanes in the Turritidae, the diagnosis must be revised to include both dextral and sinistral species. Strebel shows that in fully adult specimens, both outer and inner lips are somewhat thickened, and the outer lip may even show some traces of liration, if all the species he refers to Glypteuthria are congeneric. With the above reservation, the operculum may be said to be concentric with an apical nucleus and short ovate form, the inner face with a callous border on the anterior margins. It does not, however, show the purpuroid rotatory markings on the interior face of the operculum, which characterize *Euthria cornea*, the type of the genus to which Strebel refers Glypteuthria as a subgenus. Only an examination of the radula can finally decide the question, but the similarities of the shell, nucleus, and operculum are sufficient to render it very probable that Antistreptus will eventually form a subordinate group of Euthria.

Antistreptus magellanicus Dall.

Plate 15, figure 14.

Antistreptus magellanicus Dall, Proc. U. S. Nat. Mus., 1902, **24**, p. 532.
Glypteuthria contraria Strebel, Schwed. Sudpolar Exp., 1908, **6**, 1, p. 29, pl. **1**, figs, 4 a–c.

U. S. S. "Albatross," station 2773, near the eastern entrance to the Magellan Straits, in 10 fathoms, sand, temperature about 50° F. U. S. N. Mus. 96,190. Also at station 2777, in the strait, in 20 fathoms, gravel. North Argentine coast in latitude 37° 57′ S., in about 50 fathoms, sand.

Strebel's specimens, of which he gives an excellent figure, are somewhat more mature than ours, but did not contain the animal, so that a knowledge of the operculum is still a desideratum.

Streptodonta.

Ptenoglossa.

Scalidae.

EPITONIUM Bolten.

Scala (anonymous) Mus. Calonnianum, 1797, p. 23; type, *Turbo scalaris* Linné.
Epitonium (first section) Bolten, Mus. Boltenianum, 1798, p. 91; first species, *Turbo scalaris* Gmelin.
Cyclostoma Lamarck, Prodrome, 1799, p. 74; sole example, *Turbo scalaris* Linné.
Scala Dall, Bull. Mus. Comp. Zoöl., 1889, **18**, p. 299.

Twenty years ago I discussed the synonymy of this family, showing that if a diagnosis is required to validate a generic name there is no escape from accepting the name of Cyclostoma for the wentletraps. I proposed to take the anomymous name usually, at that time (but wrongly as we now know), ascribed to Humphrey. Since then much has been done to clarify the rules governing these matters, and it is generally conceded that an anonymous pamphlet with no ostensible publisher cannot be cited in nomenclature for valid generic names. The next name in order is Epitonium of Bolten, of which the first section is identical with Scala. I have decided to adopt this, as to further oppose the change would only put off the evil day, and it is best to get it over.

Ferminoscala Dall, nov.

Whorls in contact, turritelloid, reticulate, with a single heavy varix for the fully mature shell; base with no umbilicus, a basal disk present; type, *Scala ferminiana* Dall.

Epitonium (Ferminoscala) ferminianum Dall.

Plate 8, figure 8.

Shell large, solid, acute, with eleven or more closely adherent whorls, of a livid flesh-color, fading to white, the terminal varix white; surface dull, not polished; axial sculpture of numerous low, small, sharp lamellae, slightly more prominent before the suture in the last two whorls; these are reticulated by half a dozen prominent, flattish spiral threads with wider interspaces in which run much finer threads; the basal disk is also covered with close-set, very fine spiral threads, and the suture is laid on its posterior margin; aperture rounded, slightly patulous in the prolongation of the axis, and in the fully adult shell with a thick, white varicose peritreme bevelled away from the actual aperture to the thicker portion of the varix behind. Length of shell, 38; of last whorl, 21; diam. of disk, 15.5; of last whorl, 17 mm.

U. S. S. "Albatross," station 2804, in 27 fathoms, mud, Panama Bay, U. S. N. Mus. 96,628. Also station 3391, in the Gulf of Panama, in 153 fathoms, mud, bottom temperature 55°.8 F.; station 2834, off Lower California, in 48 fathoms, mud, bottom temperature 56°.4 (figured type, U. S. N. Mus. 96.818); and station 3034, in the Gulf of California, off Point Fermin, in 24 fathoms, temperature 63°.5.

The fragment collected at station 3391 was the only specimen showing the fully mature varicose lip.

I wrote a description of this species and had the present figure prepared about 1892, but although I have a strong impression the diagnosis was published, I have mislaid the reference to it and so give a brief description.

Epitonium (Ferminoscala) brunneopictum Dall, n. sp.

Plate 8, figure 10.

Shell slender, acute, pale brownish, with broad peripheral band and basal disk of darker brown, and about eleven whorls, exclusive of the (lost) nucleus; sculpture of the same type as in the preceding species with, between the sutures, three primary and about six secondary spirals beside the spiral striae; the axial lamellae are very small and sharp, regularly spaced, little raised and about thirty-six on the penultimate whorl, they appear as whitish lines on a brown background; basal disk sharply spirally threaded, little raised; aperture as figured, when fully grown probably with a thick varix. Length of shell, 37; of last whorl, 14; of aperture, 8; diam. of basal disk, 9; max. diam. 10 mm.

U. S. S. "Albatross," station 2835, in 5½ fathoms, mud, off Lower California. U. S. N. Mus. 97,084.

This and the preceding species present an assemblage of characters not provided for in the existing series of sections proposed for members of this genus.

The nucleus is extremely minute in *E. ferminianum*, and the very earliest whorls show the sculpture normal except that the peripheral thread carinates the whorl. It is probable that *Scala mitchelli* Dall, of the Texas coast, forms a third member of the subgenus. It resembles the present form a good deal, but is much stouter and larger.

Epitonium (Sthenorhytis) turbinum Dall, n. sp.

Plate 9, figures 5, 6, 8.

Specimen decollate, as figured, but showing the specific characteristics sufficiently well; form depressed-turbinate, aperture circular, very oblique; whorls coherent, rapidly enlarging, probably four or five originally; smooth, except for incremental lines; last whorl with ten strong, broad, sharp-edged varices of triangular section, the posterior portion pressed back upon and concealing the suture; basal disk faintly developed, the varices confluent on the base; umbilicus absent; peritreme nearly circular. Height of last whorl, 22; diam. of last whorl, 28; of aperture exclusive of the varix, 11 mm.

U. S. S. "Albatross," station 4642, four miles S. 41° E. from the east point of Hood Island, Galapagos Islands, in 300 fathoms, broken shell, bottom temperature 48°.6 F. U. S. N. Mus. 110,568.

This is the most depressed species of this group (regarded by some authors as a genus) which has yet been described, as it is almost certain that the spire, when perfect, diminishes with proportionate rapidity to that of the portion figured. Its nearest relation, so far as known, is the *S. stearnsii* Dall, of the Pliocene of San Diego, California, but this is considerably more elevated than the Galapagos species.

Gymnoglossa.

Eulimidae.

STILIFER Broderip.

Stilifer (Mucronalia) sp. ind.)

Mucronalia? Hartlaub, Bull. Mus. Comp. Zoöl., 1895, **28**, p. 146, pl. **4**, fig. 25.

On a species of Bathymetra, dredged by the U. S. S. "Albatross," at station 3381, off Malpelo Island, Gulf of Panama, in 1772 fathoms, mud, bottom temperature 37°.2 F.

In Hartlaub's account of the crinoids of the "Albatross" above cited, he mentions and figures a species, referred by E. von Martens to Mucronalia, parasitic on a species of crinoid, later referred by Clark to Bathymetra. The specimen has not yet been submitted to the writer, and the figure is insufficient to base a specific description upon. It resembles *Stilifer* (*Mucronalia*) *thomasiae* Sowerby, of the West Indies, and is fixed to one of the arms of the crinoid. If the species is hereafter recovered it might appropriately take the specific name of *bathymetrae*.

Janthinidae.

JANTHINA (Bolten) Lamarck.

Janthina, Bolten (first section) Mus. Boltenianum, 1798, p. 75; type, *Helix janthina* Linné; Lamarck, Prodrome, 1799, p. 75, same type.
Ianthina Jeffreys, 1867, p. 174.

The second section of Bolten's genus was composed of helices. Lamarck, the following year, adopted Bolten's genus with its first species as type, and this arrangement is universally accepted.

Janthina pallida Harvey.

Janthina pallida Harvey, in Thompson's Annals of Nat. Hist., 1817, **5**, p. 96, pl. **2**, fig. 2; Thorpe, Brit. Marine Conch., 1844, p. 152.

U. S. S. "Albatross," station 3381, East of Malpelo Island, Gulf of Panama. U. S. N. Mus. 123,024.

This species of worldwide distribution was described from specimens cast up on the shores of Ireland, and has even been reported from the Straits of Magellan.

Taenioglossa.

Septidae.

DISTORSIO Bolten.

Distorsio Bolten (first section) Mus. Boltenianum, 1799, p. 133; first species, *Murex anus* Gmelin.
Distortrix Link, Besch, Rostock Samml., 1807, p. 122.

In 1889, discussing the synonymy of this genus, I stated that the name given by Bolten was a "pure catalogue name," having neither description or figure, and for that reason did not adopt it. But Bolten gives references to Gmelin's description and the figures of Martini and Knorr, and names thus validated, by the general consent of naturalists and the development of the international code of rules for biological nomenclature, have come to be considered admissible, and I therefore have been obliged to modify my views based upon the original code of 1842.

Bolten's group was divided into two sections, one containing species of Distorsio (with one not dissimilar form *Triton tuberosum* Lamarck); the second containing Lamarckian Nassas of the *N. arcularia* group, which were afterward separated by Link as a distinct genus, Arcularia, which he credits to Bolten, though the name does not occur in Bolten's posthumously published system. Link was in the habit of changing the desinence of names which did not please him, and his Distortrix was one of these to which he places Distorsio Bolten, as a synonym, minus, of course (as he indicates later) the Arcularia group. The question, therefore, arises: are we to regard Distortrix and Distorsio as two things or one? At first I thought we could use both, and so in 1904 (Frogshells and Tritons, p. 133) retained Distortrix, thinking Distorsio might be retained for the remnant; but, after more mature consideration, I believe this was incorrect and that, following Tryon, we should adopt Distorsio in its original form, and regard Distortrix as an absolute synonym thereof.

If we do not do so, but proceed by elimination, Distorsio will supplant Gutturnium Mörch as a designation for the "Tritons" of the *tuberosum* group.

Distorsio decussatus VALENCIENNES.

Triton decussatum Valenciennes, Humboldt Voy., 1833, **2**, p. 306; Reeve, Conch. Icon., 1844, *Triton*, pl. **12**, fig. 41.

U. S. S. "Albatross," station 3355, Gulf of Panama, in 182 fathoms, mud, bottom temperature 54°.1 F. U. S. N. Mus. 123,026.

TRITONOHARPA DALL, nov.

Shell recalling *Eocithara* in shape, with a simple suture, the whorls axially ribbed and at intervals varicose, varices not continuous up the spire; surface with minute velvety sculpture; aperture with the peritreme elevated and continuous behind, the inner lip smooth, with the outer margin of the callus detached from the whorl; outer lip denticulate, varicose at resting stages; canal proximally more or less constricted, narrow, produced, and recurved; throat not lirate. Operculum?

Type, *Tritonoharpa vexillata* Dall.

This peculiar little shell has refused to be suitably placed in any known genus. The aperture is unlike that of any form of Cymatium known to me, and, in the absence of the soft parts, it is only referred provisionally to the Septidae. The sculpture recalls that of Harpa in miniature, except that the ribs do not spread over the suture and the varices stand out vertically from the surface. The denticulate outer lip recalls some forms of Cassis and the thin outer sculptured layer of shell forms a surface not unlike, in texture, that of *Cassis cameo* Stimpson. But none of the Cassididae has a continuous raised lamella without sculpture behind the aperture. If Mayer's genus Silia possesses in reality the characters allotted to it by diagnosis, — but rendered doubtful in some respects by the fact that the genus is only known from an internal cast, — it would approach this form in some of its features.

Tritonoharpa vexillata Dall, n. sp.

Plate 8, figure 7.

Shell small, six-whorled, with rather elevated spire, rounded and axially ribbed whorls, whitish in color, with seven or eight narrow, spiral brown bands on the last whorl and three between the sutures; nucleus flat-topped and more or less eroded; whorls succeeding with (on the last whorl fourteen) flexuous, rounded ribs extending clear over the whorl, crossed by rounded threads of about three different sizes, more or less attenuated, and the larger ones becoming swollen where they override the summits of the ribs; the threads are close together, and are also crossed by thin, almost microscopic, regular, elevated, incremental lines which, being closely adjacent, resemble the thread wound on a spool, over the whole surface; beside the ribs the whorls bear thin, sharp varices a little higher than the ribs, there being from six to eight ribs between every two varices; aperture narrow, the body and pillar with a continuous elevated callus with an edge free from the whorl; outer lip thin, entire, white, with small brown spots where the brown color bands terminate, and a small denticle on each spot; canal short, narrow, recurved, with a prominent fasciole. Alt. of shell, 15; of last whorl, 11; of aperture, 9; max. diam. of last whorl, 7.5; of aperture, 3.5 mm.

U. S. S. "Albatross," station 4642, four miles S. 41° E. from Ripple Point, Wood Island, Galapagos Islands, in 800 fathoms, broken shell, bottom temperature 48°.6. U. S. N. Mus. 110,580.

Ranellidae.

BURSA Bolten.

Bursa (Lampadopsis) calcipicta Dall, n. sp.

Shell of moderate size, pale brown with a white, chalky, deciduous, thin, outer coating minutely spirally threaded (about six threads to a millimeter), the threads reticulated by about equal, minute, equidistant, raised lines in harmony with the lines of growth; this coating covers the whole shell except where eroded; whorls seven, rapidly increasing, the first three smooth, evenly convex, nuclear, abruptly followed by the adult sculpture; varices two to the whorl, lateral, nearly continuous on the spire; on each whorl, at the shoulder, four (except the last half of the last whorl which has five) rounded nodules in a spiral series, with in front of them on the spire a second smaller and slightly more numerous series; between the appressed suture and the shoulder are four small beaded spirals, with one between the two series of nodules, while the base of the shell is similarly but less distinctly sculptured; aperture ovate with a wide, prominent semitubular canal at the suture; outer lip strongly varicose, with four large rounded nodules on the varix, the edge of the lip modified by the sculpture, not lirate within, white with a few inconspicuous brown spots; body with a thin varnish of callus wholly adherent, a narrow subsutural ridge near the middle, and a small brown spot at the left; pillar white, callous, arcuate, with six or eight low sharp spiral lirations; canal short, wide, bent to the right with a strong siphonal fasciole and a chink under the anterior edge of the columellar callus; throat pinkish. Lon. of shell, 44; of last whorl, 31; of aperture, 25; max. diam. 25 mm.

U. S. S. "Albatross," station 3368, near Cocos Island, Gulf of Panama, in 66 fathoms, rocky bottom, temperature 58°.4 F. U. S. N. Mus. 123,027.

Nearest to *B. caelata* Broderip, but of a totally different color and surface, and differing also in details of sculpture.

Cassididae.

OÖCORYS Fischer.

Oöcorys Fischer, Journ. de Conchyl., Feb., 1884, **31**, p. 392; type, *O. sulcata* Fischer, *op. cit.*

Benthodolium Verrill and Smith, Trans. Conn. Acad., May, 1884, **6**, p. 177; type, *B. abyssorum* Verrill and Smith, *loc. cit.*

In the Monograph of the Miocene of Astoria and Coos Bay, Oregon, I have fully explained my reasons for regarding Oöcorys as a member of the family *Cassididae*, rather than, as Fischer thought, entitled to a separate family of its own.

In the Blake Report (1889, p. 228) I divided the genus from Atlantic specimens into two sections as follows:

Section *Oöcorys* s. s. Type, *O. sulcata* Fischer.

Shell not umbilicate, pillar twisted, obliquely truncate, without a marked siphonal fasciole, outer lip smooth.

Section *Benthodolium* V. and S. Type, *B. abyssorum* V. and S.

Shell with a narrow but distinct umbilicus and a strong siphonal fasciole; outer lip obscurely denticulate when fully adult.

Since then, having seen more material, I am in doubt whether these sections should be maintained or not, though complete continuity between them is not yet established. The range of variation is hardly known. It will be observed that I agree entirely with Locard in his "Talisman" report as to the relations of the genus to the Cassididae and, I may add, in referring to it Watson's *Buccinum aquilarum* from near the Azores. The species now known are *O. aquilarum* Watson, *O. sulcata* Fischer, *O. abyssorum* V. and S., *O. watsoni* and *O. fischeri* Locard, from the Atlantic, and the following forms from the Pacific.

Oöcorys rotunda Dall, n. sp.

Plate 4, figure 9.

Shell globose, with a moderately elevated, blunt-tipped spire, and about six whorls; suture distinct, not channelled, the whorl immediately in front of it a little flattened; spiral sculpture of (on the penultimate whorl between the sutures eleven, on the last whorl about thirty-seven) subequal, regular, flattish cords with narrower channelled interspaces; the cord in front of the suture is feeble, in front of it the next half dozen are a little stronger and more distant than the remainder, which are almost absolutely similar; axial sculpture of fine rather regularly spaced little elevated lines which occasionally override the cords but are mostly confined to the interspaces which they reticulate; there are also perceptible incremental lines; the substance of the shell is very pale flesh color, covered with a thin, smooth, olive-gray periostracum; the specimen has not formed the outer lip, but the aperture is lunate, ample, and with a short shallow canal; inner lip slightly erased and polished, not callous; pillar simple, twisted, anteriorly obliquely attenuated; axis not pervious; a moderately distinct siphonal fasciole; there is a very thin layer of callus on the pillar, this is broken anteriorly, showing a minute chink beneath it; throat white, the sculpture showing through the thin shell but not lirate. Length of shell, 45; of last whorl, 37; of aperture, about 25; max. diam. 29 + mm.

U. S. S. "Albatross," station 3360, Gulf of Panama, in 1672 fathoms, sand, bottom temperature 42°F. U. S. N. Mus. 123,029.

The operculum is like that figured in the aperture of *O. pacifica* (Plate 4, figure 7). The shell is not unlike that species, but is larger, and has not the large and deep umbilicus of *O. pacifica*, neither does it agree closely with any of the Atlantic species.

Oöcorys elevata Dall, n. sp.

Plate 8, figure 9.

Shell thin, white, bucciniform, with a thin pale straw-colored dehiscent periostracum, with about five rounded whorls exclusive of the (lost) nucleus; suture distinct, not appressed; surface spirally sculptured with (between the sutures ten, on the last whorl about twenty-two flat spiral elevated bands separated by wider but distinctly channelled interspaces; the bands are somewhat irregular in size and occasionally bifid by a median moderately impressed line; axial sculpture comprising fine, regular, close elevated lines, equally spaced and, while absent from the flat tops of the broader spirals, yet crenulating their angular edges and more or less evident in the channels between them; aperture semilunate, outer lip simple, smooth, slightly reflected; body with a thin wash of minutely granular callus, which also covers the short twisted pillar, leaving a minute chink behind it; pillar obliquely truncate in front, twisted, not axially pervious; canal short, wide, slightly recurved, with no fasciole; operculum like that of Lunatia in form, comprising about one whorl. Alt. of shell, 60; of last whorl, 47; of aperture, 35; max. diam. 31 mm.

U. S. S. "Albatross," station 4649, between the Galapagos Islands and Sechura Bay, Peru, in S. Lat. 5° 17′, and W. Lon. 85° 20′, 2235 fathoms, mud, bottom temperature 35°.4 F. U. S. N. Mus. 110,569.

There is a minute chink behind the elevated edge of the columellar callus anteriorly, but no umbilicus. This appears to be the largest shell from so great a depth of water that has yet been collected; the depths noted by the "Challenger" are somewhat inexact, owing to the use of hemp rope in dredging, and nearly all excessive; but taking them at their face value, a Dentalium, a Chiton, and a Pleurotomoid shell alone were obtained from greater depths.

Oöcorys (Benthodolium) pacifica Dall.

Plate 4, figure 7.

Benthodolium pacificum Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 11.

Shell resembling *B. abyssorum* Verrill and Smith, from the North Atlantic, from which it differs by its much more elevated spire with the same number of whorls, its smaller last whorl and aperture in proportion to the whole shell, its more slender pillar and larger umbilicus, and especially by having its spiral sculpture less crowded, and reticulated by narrow, flattened threads overrunning the spirals and in harmony with the lines of growth. Lon. of shell, 30; of last whorl, 24; of aperture, 20; max. diam. 20 mm.

U. S. S. "Albatross," station 3375, near Malpelo Island, Gulf of Panama, in 1201 fathoms, ooze, bottom temperature 36°.6 F.

U. S. N. Mus. 123,031.

The operculum is narrower and less spiral than that of the Atlantic species.

A fragment probably belonging to this species was also dredged at station 3386, in 1067 fathoms, globigerina ooze, bottom temperature 37° F.

The fine reflected outer lip of this species is obscurely ribbed like that of Eudolium, but the difference in the nuclear shell and in the operculum are quite sufficient to make the distinction between them easy.

At station 3422, off Acapulco, Mexico, in 141 fathoms, mud, bottom temperature 53°.5 F., a number of larval shells were obtained which appear to belong to a young stage of a species of Doliidae; even the genus cannot with our present knowledge be definitely determined.

Cypracidae.

TRIVIA Gray.

Trivia atomaria Dall.

Plate 12, figures 8, 10, 11.

Trivia atomaria Dall, Nautilus, Aug., 1902, **16**, p. 43.

Dredged in Panama Bay in 1888, in 18 fathoms, muddy bottom. U. S. Nat Mus. 109,206.

This is one of the smallest species known.

Trivia panamensis Dall.

Plate 12, figures 7, 9, 12.

Trivia panamensis Dall, Nautilus, Aug., 1902, **16**, p. 43.

Dredged in Panama Bay with *T. atomaria*. U. S. N. Mus. 109,205.

ERATO Risso.

Erato oligostata Dall.

Plate 11, figure 8.

Erato oligostata Dall, Nautilus, Aug., 1902, **16**, p. 44.

This is one of the smallest, if not actually the very smallest, of the genus. It was dredged in Panama Bay in 1888, with the two preceding species. U. S. N. Mus. 109,207.

Trichotropidae.

CERITHIODERMA Conrad.

Cerithioderma Conrad, Journ. Acad. Nat. Sci. Phila., March, 1860, 2d ser., **4**, p. 295; type, *C. prima* Conrad, *op. cit.*, pl. **47**, fig. 30; Dall, Trans. Wagner Inst., 1892, **3**, p. 293; Harris, Bull. Amer. Pal., 1895, **1**, p. 15, pl. **1**, fig. 10. Eocene of Alabama.

Mesostoma Deshayes, An. s. Vert. bas. Paris, 1861, **2**, p. 416; 1st sp. *M. pulchra* Deshayes, *op. cit.*, pl. **28**, figs. 13–16. Parisian Eocene.

Cerithioderma pacifica Dall, n. sp.

Shell small, thin, pale olivaceous, with a thin, fibrous, adherent periostracum and about five whorls exclusive of the (lost) nucleus; suture distinct, somewhat constricted, not appressed; whorls well rounded, on the fourth with about sixteen slender low ribs extending vertically from suture to suture, and crossed by two prominent spiral ridges of about the same strength as the ribs, the anterior ridge at the periphery; on a third similar ridge bordering the base the suture is laid and the ribs cease; on the base are four spiral ridges, low and rounded, subequal with subequal interspaces, but the region of the canal is not sculptured; in the adult this sculpture is obsolete on the last whorl, and, on the spire, the intersections are sometimes nodulous; aperture wide, ovate, the outer lip thin, simple, the body with a faint callus; pillar short, twisted, straight; canal represented by a shallow hardly perceptible indentation. Lon. of defective adult, 11 +; of spire, four whorls, 7; max. diam. 7 mm.

U. S. S. "Albatross," station 3392, in the Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F. U. S. N. Mus. 123,032.

The description is written from an adult with base defective, and a young shell of four whorls. The adult aperture may therefore present some features not noted here.

This genus occurs in the Middle Eocene of both the Paris basin and Alabama. A recent species, *C. migrans* Dall, has been described from eighty fathoms in the Straits of Florida, and probably further researches into the deep-sea faunas will reveal others. So far no specimen with the soft parts or operculum has been obtained.

Seguenziidae.

SEGUENZIA Jeffreys.

Seguenzia occidentalis Dall, n. sp.

Shell small, pearly under an opaque dull white outer coat, with five turbinate whorls and a small globular, subtranslucent, glossy nucleus; whorls with three prominent spiral keels, the strongest at the periphery, the others at the shoulder and the edge of the base, about equidistant from the suture and each other; the base with three smaller more adjacent spirals, and between them and the umbilicus four or five still finer spiral threads; axial sculpture in the interspaces of almost microscopic elevated arcuate radial lines in harmony with the lines of growth and crossed by extremely fine microscopic spiral striae; base rounded, the umbilicus perforate, partly shadowed by the thin reflected edge of the pillar; aperture subquadrate, deeply widely notched near the suture; the body with a thin wash of callus, the pillar vertical, simple, lightly reflected, at the anterior end forming a right angle with the anterior margin of the aperture; operculum wanting. Lon. of shell, 2.9; of aperture, 1.7; max. diam. 3.1 mm.

U. S. S. "Albatross," station 3418, off Acapulco, Mexico, in 660 fathoms, sand, bottom temperature 39° F. U. S. N. Mus. 123,033.

The chief features of this species are the perforate umbilicus, the Trochoid form, and the three principal carinae, a combination quite sufficiently distinguishing it from any of the hitherto described Atlantic species.

Seguenzia stephanica Dall, n. sp.

Shell small, whitish, nacreous, shining through a translucent outer coating; with about six whorls and a minute translucent glossy subglobular nucleus; whorls with four strong spiral keels, the posterior pair somewhat nearer the suture and each other than they are to the anterior pair, that is, the peripheral interspace is widest; the anterior keel of the four forms the margin of the base of the last whorl, but the suture is wound on the third keel; base with about eight much smaller, adjacent, simple, spiral threads extending to the pillar, the umbilicus imperforate; axial sculpture of very minute elevated, arcuate, radial lines, in harmony with the lines of growth which minutely but distinctly bead the keel nearest the suture, but do not affect the others; aperture subquadrate, outer lip modified by the sculpture, thin, concavely arcuate behind; body with a thin wash of callus; pillar thin, concave, strongly twisted, not reflected, truncate anteriorly, so that its junction shows a projecting point in front of a shallow sulcus. Lon. of shell, 4.0; of aperture, 1.5.; max. diam. 3.5 mm.

U. S. S. "Albatross," station 3431, off Mazatlan, in 995 fathoms, mud, bottom temperature 37° F. U. S. N. Mus. 123,034.

This species is easily distinguished from the preceding by the different sculpture, its more elevated form, and the absence of the umbilical perforation. It is nearest among described species to the *monocingulata* of Seguenza, from which it may be instantly distinguished by the beaded ante-sutural keel and its somewhat broader and shorter conical form.

Vermetidae.

PETALOCONCHUS Lea.

Petaloconchus complicatus Dall, n. sp.

Coil at first closely wound and more or less obliquely bent in conformity with its situs, the first few turns with a subcircular section, very irregularly disposed, those following with a roughly hexagonal section closely coiled around a barely perforate axis, closely coherent to each other and running up to twenty or more in number, after which the tube once more becomes erect, with a circular section, and a slight dextral twist; aperture circular, often with a series of internal concentric lamellae as if the animal had attempted to contract the opening by secreting a succession of smaller tubes within it; sculpture irregular; apart from incremental lines, there is a longitudinal, irregular, but tolerably smooth ridge on the middle of the exposed whorl with strong wrinkles at right angles to it on each side but not crossing it. At resting stages there are sometimes angular projections of the margin of the temporary aperture; the wrinkles are sometimes reticulated by longitudinal subequal threads, which may be entirely wanting on other parts of the same individual; the erect portion is nearly smooth except for lines of growth; the color is a pale ferruginous brown; the length of the coiled portion may be about 16, and of the erect part 27 mm., the tube with a diameter at the aperture of 2.3 mm. There is one internal basal lamella and a smaller one projecting from the axial wall at about right angles to and a little above the former.

U. S. S. "Albatross," station 3368, near Cocos Island, on dead shells, at a depth of 66 fathoms, bottom temperature 58°.4 F. U. S. N. Mus. 123,035.

This has somewhat the habit of the typical species of the genus, but is smaller, less regular, and with a much smaller axial perforation.

Turritellidae.

Turritella mariana Dall, n. sp.

Plate 11, figure 14.

Shell slender, pale pinkish-brown, acute, with about eighteen whorls; suture rather obscure, not appressed; whorls strongly constricted in the middle, a sharp keel on each side of the constriction, which in the last two or three whorls is undulate or obscurely beaded; nucleus lost; on the earlier whorls the keels are entire and the whorl slopes about the same distance from each to the adjacent suture; on the latter whorls there is a single thread behind the posterior keel and two in the trough between the two keels, all somewhat undulate, low, and inconspicuous; base of the whorl with a sharp carina upon which the suture is laid; within the carina deeply concave, with well-marked lines of growth and microscopic spiral striae; aperture rounded-quadrate, the outer lip with the margin at first retractive to a wide sinus nearly coincident with the posterior keel, then prominently protractive to the basal keel, thence in a deeply excavated curve to the pillar, which is thin and arcuate, short and gyrate, about a narrowly pervious axis. Lon. of shell, 25; of last whorl, 6; of aperture, 3; max. diam. 5 mm.

U. S. S. "Albatross," station 3427, near the Tres Marias Islands, in 80 fathoms, rocky bottom, temperature 51°.2 F. U. S. N. Mus. 123,036.

Although there is only a single specimen of this species, it is in excellent preservation, and on comparison with a large series of the Pacific Coast species could be identified with none among them.

Solariidæ.

ARCHITECTONICA Bolten.

Architectonica Bolten, Mus. Boltenianum, 1798, p. 78; first species, *Trochus perspectivus* Gmelin.

Solarium Lamarck, Prodrome, 1799, p. 74; sole ex., *Trochus perspectivus* Linné.

Architectoma Gray, P. Z. S. Lond., 1847, p. 151; *err. typ. pro Architectonica.*

Architectonica radialis Dall, n. sp.

Shell small, depressed, pale yellowish over a white inner layer, the apical whorls lost but about three whorls remaining; surface very badly eroded, only remaining in small patches, one of which on the last whorl shows four arcuate radial riblets on the top of the whorl in a space of 3.5 mm., with wider interspaces, crossed by faint indications of spiral striae; near the aperture these riblets (which presumably were present over most of the spire) are obsolete; and the spiral lines extend from a (very slightly) channelled suture to an obtuse angle at the periphery and are represented on the rounded base by still fainter traces but without radial sculpture except incremental lines; umbilicus in width to the whorl near the aperture as 2.5 to 4.0; margin of the umbilicus with a double row of beads on the earlier whorls (visible inside the umbilicus), but on the last whorl all that remain are about ten very short radial ridges; verge of the umbilicus only feebly angular; aperture rounded, peritreme simple, sharp, continuous; operculum externally flat and multispiral, the edges of its whorls slightly overlapping; inner face with a central prominence, formed by the opercular layers being coiled loosely upon each in the manner of a paper "spill." Max. diam. of shell, 9.2; min. diam. 7.5; diam. of aperture, horizontally, 4.3; height of spire, 4.7 mm.

U. S. S. "Albatross," station 3392, in 1270 fathoms, hard bottom, temperature 36°.4 F., in the Gulf of Panama.

This is an interesting species notwithstanding its poor condition, having an easily recognizable sculpture, unlike that of any other known. The operculum is peculiar and apparently related to that of Torinia, but the opercula of all this family seem to be constructed on the same plan, notwithstanding superficial differences. I prefer not to attempt to refer this species to its subdivision of the genus without better material, though it is obvious that it is not a typical Architectonica.

Choristidae.

CHORISTES Carpenter.

Choristes Carpenter, Canadian Nat., 1872, **6**, p. 392; type, *C. elegans* Cpr., *op. cit.*, pl. **7**, fig. 13; Verrill, Trans. Conn. Acad. Sci., 1882, **5**, p. 541.

Choristes carpenteri Dall.

Plate 3, figure 4.

Choristes carpenteri Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 10.

Shell large, solid, of three and a half rounded whorls, white, covered with a pale olivaceous epidermis, sculptured only with somewhat irregular, rude, incremental lines; suture deep, the whorl in front of it slightly excavated; base rounded, the umbilicus narrow, deep; aperture subovate, not interrupted by the body; the inner lip nearly straight, the outer lip simple, sharp-edged; the interior of the aperture white. Height (somewhat eroded), 21; height of aperture, 14; diameter, 21 mm.

U. S. S. "Albatross," station 3382, Gulf of Panama, in 1793 fathoms, mud; bottom temperature 35°.8 F. U. S. N. Mus. 123,039.

Another specimen was dredged at station 3361 in 1471 fathoms, ooze, bottom temperature 36°.6 F. and a defective individual at station 3415, off the Mexican coast in Lat. 14° 46′ N., in 1879 fathoms, ooze, bottom temperature 36° F.

This is the second species of this very interesting genus, and the first from the Pacific. It is larger, more elevated, and much more solid than the form from the North Atlantic on which Dr. P. P. Carpenter erected the genus.

The operculum of this species has about three whorls and is thin, brown, and wholly horny, the external surface extremely concave, so that the appendage has the form of a shallow bowl. The animal agrees in general appearance with that of *C. elegans*, var. *tenera* Verrill, as described by Verrill from deep water off the North Atlantic coast.

Capulidae.

CAPULUS Montfort.

Capulus (*pars*) Montfort, Conch. Syst., 1810, **2**, p. 55; Cuvier, Règne Anim., 1817, **2**, p. 447; *Patella ungarica* (Linné).

Galerite (Brongniard) in Roissy, Hist. Nat. Moll., 1805, **5**, p. 211.

Galerita (Brongniard) in Fischer, Tabl. Syst. Zoogn., 1808, p. 25; 1st. sp. *G. ungarica* Linné. Not *Galerita* Fabricius, *Coleoptera*, 1801.

Amalthea β. Schumacher, Essai, 1817, p. 181; *Patella ungarica* (Linné). Not *Amaltheus* Montfort, 1810.

Cabochon Lamarck, Extr. d'un Cours, 1812, p. 114.

Pileopsis (*pars*) Lamarck, Anim. s. Vert., 1822, **6**, p. 16.

Actita Fischer de Waldheim, Adversaria Zool., 1825, **3**.

The first person to segregate this group was Bolten, who listed them as *Patellae uncinatae* in 1798, and the first to apply a generic name to them was Brongniard, whose name was published by Fischer, but unfortunately it had previously been used for a beetle. Montfort, in 1810, based his genus Capulus on a combination of *Patella ungarica* Linné, and *P. subrufa* (Lister, Conch., pl. **544**, fig, 32), the latter being an Hipponix. Montfort's figure seems certainly to represent an Hipponix. But as Linné himself had made the same combination and the name of *Patella ungarica* had become fixed upon the European shell, by common consent the latter is regarded as the type of Capulus.

Later writers combined Capulus with Hipponix Defrance, under the (pre-occupied?) name of Amalthea, and Lamarck under that of Pileopsis. It is truly remarkable how long it took the heterogeneous assembly of Linnean Patella to get subdivided into its natural groups.

Capulus chilensis Dall, n. sp.

Shell large, rather thin, yellowish-white, covered with a straw-colored branny periostracum, and comprising somewhat less than three whorls; nucleus subglobular, glassy, swollen, smooth; spire dextral, the shell, except a small part of the apex, symmetrically coiled; aperture subcircular; spire closely coiled, part of the arch extending behind the middle of the aperture, especially in young shells;

margin entire, simple, in the adult, in the young slightly crenulate by the radial sculpture; concentric sculpture feeble, chiefly of the incremental lines; radial sculpture of rather conspicuous threads with wider interspaces in the young; the threads flatten and become much wider and the interspaces mere grooves, in the adult; longer diam. of base about 25 mm., height 9 mm.

U. S. S. "Albatross," station 2781, off the Chilean coast, in 348 fathoms, mud, temperature 50° F. U. S. N. Mus. 96,926.

This species differs from *C. ungaricus* in its closely coiled spire and different periostracum, and from the Peruvian *C. ungaricoides* Orbigny, in its strong sculpture, symmetrical habit, and different color.

Hipponicidae.

HIPPONIX Defrance.

Capulus (*pars*) Montford, Conch. Syst., 1810, **2**, p. 55, and figure.

Amalthea a, Schumacher, Essai, 1817, p. 181, sole ex. *A. conica* Schumacher = *Patella australis* Lam., *fide* Smith. Not *Amaltheus* Montfort, 1810.

Hipponix Defrance, Bull. Soc. Philom. Paris, Jan., 1819, 3me sér, p. 8–9 (type, *H. cornucopiae* Defr.) Journ. de phys., de chymie, d'hist. nat., etc., Mar., 1819, **88**, p. 217; Ferussac, Tableau, 1821, p. xxxvii.; Defrance, Dict. Sci. Nat., 1821, tom. 21, p. 185; Deshayes, Encyc. Méth., 1830, **8**, p. 274; Anton, Verzeichniss, 1839, p. 28.

Pileopsis (*pars*) Lamarck, Anim. s. Vert, 1822, **6**, 2, p. 19 (*Les hyponices* Defrance), *Pileopsis cornucopiae* Lamarck; Defrance, Tabl. Corps Organ., 1824, *Les hipponices*, pp. 13, 14, 111, 134.

Hipponyx Blainville, Dict. Sci. Nat., 1824, **32**, p. 297; Man. Conch., 1825, p. 507; Sowerby, Genera, 1820, part 1, 1st ed., pl. **3**; 1821, 2d ed., pl. **3**; Bowdich, Elem. Conch, 1822, **1**, p. 35, *H. cornucopiae* Defr.; Swainson, Man. Malac., 1840, p. 356.

Malluvium Melvill, Proc. Mal. Soc. Lond., June, 1906, **7**, p. 82; type, *Capulus lissus* E. A. Smith.

According to the proposed rule, which seems generally accepted by systematists (though to the writer it appears not only unnecessary but objectionable), the presence in nomenclature of Amaltheus precludes the use of Amalthea Schumacher. The name Hipponix was consistently used by Defrance and others, and no derivation given in the original diagnosis; the alteration, therefore, by Blainville, five years later, was gratuitous, though not unnatural, according to the notions of the time.

Lamarck, ignoring Montfort's name of Capulus, evidently intended to include, as Montfort did, both Capulus and species of Hipponix in his genus Pileopsis, which thus becomes an exact synonym of Capulus Montfort. Lamarck's name, though not published, was evidently in use among the naturalists of the group associated at the Museum at Paris, and it was the discovery of the shelly support secreted by the *Hipponix cornucopiae* of the faluns of Hauteville, which led Defrance to consider the formation of a new genus. The discovery of a similar base in a living species *H.* "*mitrata* Gmelin" of Defrance (*H. antiquata* Linné) confirmed him in this opinion, and he proceeded to publish his new genus, leaving the other species of Pileopsis Lamarck, which were believed to form no shelly base, to be grouped separately. The shelly base alone might not be considered a sufficient character to found a genus upon, but the wide differences of anatomy which are claimed to exist between Capulus and Hipponix, if confirmed by more modern examination, are of even more than generic importance. *H.* "*mitrata*" being the first species in Defrance's list, might naturally serve as type, though the genus is known really to have been founded on *H. cornucopiae;* but as they are both without any doubt congeneric, the question becomes unimportant. As Defrance in using his new name terminated his specific names in *a*, it follows that he regarded the name as feminine, and subsequent writers should not try to alter this on the basis of an assumption. The smooth, deep-water species separated by Mr. Melvill have a peculiar facies, but perhaps hardly of subgeneric value. The slight importance of surface sculpture as indicative of systematic differences of such value is illustrated by the following species which unites in a single individual the characteristics of two such discrepant species as *H. antiquata* and *H. subrufa*

Hipponix delicata Dall, n. sp.

Shell solid, conical, the apex in the posterior third of the length, erect, blunt; the posterior slope steep, the anterior much longer, gentle, near the apex almost a little concave; shell substance porcellanous, greenish-white, the muscular impressions more translucent and darker colored; sculpture of the apical third concentrically lamellose, as in *H. antiquata* L., the remainder of the shell continuous with irregular but not lamellar narrow waves, delicately, evenly, radiately grooved; interior polished, with a thick smooth peritreme. Alt. 5; lon. 11; lat. 9 mm., the apex 3.5 mm. in front of the posterior edge.

U. S. S. "Albatross," station 3355, Gulf of Panama, in 182 fathoms, mud, bottom temperature 54° F. U. S. N. Mus. 123,041.

The curious combination of lamellose and radial sculpture, usually found in different species, marks this one as unique. The radial striation is finer than in any of the well-known shallow water species. The shell is fresh, though it did not contain the animal.

Hipponix barbata Sowerby.

Hipponyx barbatus Sowerby, P. Z. S. Lond., 1835, p. 5; Thes. Conch., Brachiopoda, p. 369, pl. 73, figs. 26, 27.

Beach, Chatham Island, Galapagos Islands, U. S. S. "Albatross." U. S. N. Mus. 96,044.

This species is widely distributed and is reported as far north as the Gulf of California.

Hipponix serrata Carpenter.

Hipponyx serratus Carpenter, Maz. Cat., 1856, p. 296.

U. S. S. "Albatross," station 2798, in Panama Bay, in 18 fathoms, Mazatlan, Reigen. U. S. N. Mus. 110,654.

Naticidae.

NATICA Scopoli.

Natica Scopoli, Intr. Hist. Nat., 1777, p. 392 (after Adanson); type, *N. vitellus* (Linné); Lamarck, Prodr., 1799, p. 77; sole ex., *N. canrena* Linné.

The forms with calcareous opercula having been indicated by Lamarck as typical, we may, as I have indicated in my Report on the Oregon Miocene, subdivide the group in part as follows:

Natica s. s. Umbilicus open, with a spiral ridge internally; operculum externally spirally multisulcate. *N. vitellus* Linné.

Cochlis Bolten, 1798. Umbilicus similar to that of *Natica* s. s. Operculum with a very few, or only a single marginal sulcus. *N. spadicea* Gmelin.

Cryptonatica Dall, 1892. Operculum smooth, without spiral sulci, umbilicus completely closed with a smooth pad of callus. *N. clausa* Brod. and Sowerby.

The first and second groups are tropical or subtropical; the last is cool-temperate or arctic. There are several other groups, such as Nacca, Stigmaulax, and Payreaudeautia, but these are not represented in the present collection.

Natica (Cochlis) othello Dall, n. sp.

Shell rather thin, elevated, with a rather pointed spire of four and a half whorls of which four are nuclear, smooth, and brownish, the remainder buff, very pale brown, or grayish-white, with a polished surface; suture very distinct, not channelled or appressed; periostracum dehiscent, chaffy, pale yellowish-brown; an obscurely defined whitish band in front of the suture and at the base; axial sculpture of sharply incised, numerous retractive lines, forming a halo in front of the suture and behind the shoulder of the whorl; there are about two or three of these radii to the millimeter and they average about four millimeters long on the last whorl, with wider, radially striated interspaces; the remainder of the whorl is smooth, except for faint incremental lines, and more or less obscure, obsolete, spiral striation; umbilicus narrow, with a nearly vertical, strong spiral internal rib, nearer the anterior wall of the umbilicus; aperture oval, outer lip sharp, thin; body with a moderate white callus, interrupted in front by the umbilicus; pillar white, throat livid flesh-color; operculum shelly, of two and a half whorls, internally smooth and slightly convex, externally flattish, apically depressed, white, with a single sharp sulcus at the extreme margin, running between two slightly elevated lamellae. Alt. of type specimen, 22; of aperture, 17; max. diam. 16.5 mm. A larger specimen is 23.5 by 20 mm.

U. S. S. "Albatross," stations 2799, 2800, 2801, 2803, 2804, in the Bay of Panama, in 7 to 47 fathoms, mud; also, dead specimens, at stations 3354 and 3392, in 322 to 1270 fathoms, muddy bottom. U. S. N. Mus. (types) 46,446.

The young shell has darker, faint brownish streaks obscurely disposed in two or three spiral bands. The adult is without perceptible pattern. The shell belongs to the group of "*maroccana*," under which so many distinct forms have been lumped by undiscriminating authors, and is perhaps nearest to some varieties of the West Indian *N. livida* Philippi, which has a differently sculptured operculum.

Natica (Cochlis) scethra Dall, n. sp.

Plate 11, figure 5.

Shell small, moderately elevated, with about three whorls, exclusive of a smooth, polished nucleus of two and a half whorls, which changes abruptly into the adult sculpture; suture distinct; color pale brown with three obscure pale bands, one about the region of the shoulder, another a little in front of the periphery, and the third, less distinct, on the base; all rather ill defined; whorls smooth, except between the shoulder and the suture, where start numerous (on the last whorl twenty-six), sharp, very obliquely retractive, narrow wrinkles; aperture ovate, outer lip arcuate, thin, simple, sharp; body with a well-marked callus, terminating at a notch at the posterier end of the umbilicus; at the pillar is a pad, formed by the end of a flattish ridge, which winds into the depths of the umbilicus, leaving a narrow chink to the left of the pad; anterior lip slightly thickened; operculum flat, white, with brownish clouding, a small patch of roughened callus obscuring the spiral part externally; outer edge elevated, with two deep, very narrow sulci revolving within it, the interspace forming a single flat-topped rib. Height of shell, 17.0; of last whorl, 15.5; of aperture, 11.5; max. diam. 16.0 mm.

U. S. S. "Albatross," station 3391, Gulf of Panama, in 153 fathoms, mud, bottom temperature 55°.8 F. U. S. N. Mus. 123,048.

POLINICES Montfort.

Uber (Anonymous) Mus. Calonn., 1797, p. 21.

Albula Bolten, Mus. Bolt., 1798, p. 20; not *Albula* Gronovius, 1763.

Polinices Montfort, Conch. Syst., 1810, 2, p. 223; type, *Nerita mamilla* Linné.

> *Neverita* Risso, Hist. Nat. Eur. Mér., 1826, 4, p. 147; type, *N. josephinae* Risso.

> *Euspira* Agassiz, in Sowerby, Min. Conch., 1842, German ed., p. 14. First species, *N. glaucinoides* Sowerby, = *N. labellata* Lamarck, 1804.

> *Lunatia* Gray, P. Z. S. Lond., 1847, p. 149; type, *N. ampullaria* Lamarck (= *Euspira* Ag.).

> *Cepatia* Gray, Syn. Brit. Mus., 1840; *ibid.*, 1844, p. 60; P. Z. S. Lond., 1847, p. 149; *N. cepacea* Lamarck, Eocene.

Velainia Munier-Chalmas, Annal. de Malac., 1884, **1**, p. 335 (= *Cepatia* Gray).

> *Naticina* Fischer, Man. de Conchyl., 1885, p. 766, not of Guilding, 1834.

> *Sigaretopsis* Cossmann, Cat. Illustr., 1888, **3**, p. 172; type, *N. infundibulum* Wat. Eocene (section of *Cepatia*).

Polinices in the wide sense, as the oldest available name, includes all the Lamarckian Naticas with a horny operculum. In considering the subdivisions it appears that Euspira Agassiz, which has five years' priority, notwithstanding some discrepancies in the diagnosis, will have to be used in place of the more familiar Lunatia of Gray.

Polinices uber VALENCIENNES, var. intemerata PHILIPPI.

Natica uber Val., in Humboldt, Geol. Obs., 1833, **2**, p. 266.

Natica intemerata Philippi, P. Z. S. Lond., 1851, p. 233; Tryon, Man., 1886, **8**, p. 46, pl. **18**, fig. 83.

U. S. S. "Albatross," station 3355, Gulf of Panama, in 182 fathoms, mud, temperature 54°.1 F. U. S. N. Mus. 123,043. Also at Mazatlan, Mexico, and living in Panama Bay, at station 2805, in 51 fathoms.

Tryon and Carpenter regard this as probably a variety of *P. uber*, but the specimens I have seen seem sufficiently constant to be rated as a good species.

Polinices (Euspira) agujanus DALL, n. sp.

Plate 9, figure 2.

Shell of moderate size, rather heavy, with five whorls, translucent white, with an olivaceous periostracum; suture distinct, very minutely channelled; nucleus eroded, whorls flattish in front of the suture, with a high, rounded shoulder and evenly rotund body; surface smooth except for faint, incremental lines, and, under the lens, obscure spiral markings; base rounded, with a wide, deep, subcylindric umbilicus; aperture semilunar, outer lip thin, simple; the sutural angle and the anterior part of the pillar-lip callous, a thin wash of callus on the body; operculum brown, horny, of two whorls. Alt. of shell, 26; of last whorl, 23; of aperture, 20; max. diam. 24 mm.

U. S. S. "Albatross," station 4653, 17 miles N. 61° W. from Aguja Point, Peru, in 536 fathoms, mud, bottom temperature 41°.3 F. U. S. N. Mus. 110,566.

The chief peculiarities of this species are the very minute channelling of the suture, the flat-topped whorls, and the singular want of callus on the thin, straight pillar. The last character may perhaps be altered when the shell is older, though otherwise our specimen seems fully adult. A dead and worn specimen, probably of this species, was dredged at station 3360, Gulf of Panama, in 1672 fathoms, sand, bottom temperature 42°. F.

Polinices (Euspira) solutus Gould.

Plate 8, figure 2.

Natica soluta Gould, Proc. Boston, Soc. Nat. Hist., July, 1847, **2**, p. 229; Expedition Shells, 1850, atlas, fig. 257; Tryon, Man., 1886, **8**, p. 39, pl. **9**, fig. 71.

Shell small, heavy, translucent white with an olivaceous periostracum, moderately elevated spire, and five whorls; nucleus eroded, remaining whorls rounded from the margin of the narrow, deep suture, to the umbilical region; surface smooth, polished, with very fine, silky, incremental lines, and microscopic spiral striae; aperture semilunar, outer lip simple, body with a subsutural callus and a thin layer connecting with the pillar over the body; pillar lip thickened and slightly reflected; base rounded, with a very minute, umbilical perforation under the reflected callus. Alt. of shell, 17.0; of last whorl, 15.5; of aperture, 11.0; max. diam. 15.0 mm.

Operculum brown, horny, of two whorls.

U. S. S. "Albatross," station 4653, 17 miles N. 61° W. from Aguja Point, Peru, in 536 fathoms, mud, bottom temperature 41°.3 F. U. S. N. Mus. 110,567. Also at station 2791, on the southwest coast of Chile, in 667 fathoms, mud, temperature 38°; and young specimens at stations 2781, 2784, and 2785, in 194 to 449 fathoms, mud, temperatures 47° to 51°.9 F., from the vicinity of Magellan Straits northward to Chile.

This species was referred by Carpenter and Tryon to *Euspira pallida* Broderip and Sowerby, but this ascription is absurd, since the latter species is without the sutural channel and has a decidedly different outline, besides being a very much larger shell.

Polinices (Euspira) crawfordianus Dall, n. sp.

Plate 11, figure 7.

Shell small, white, smooth, covered by a conspicuous, brownish periostracum; whorls about four, the nucleus eroded; suture distinct, deep; the whorls rather full at the shoulder, giving a somewhat elongated aspect to the shell, rounded, the last much the largest; sculpture of incremental lines rather feeble and irregular, and, on the spire, numerous, not very regular, fine wrinkles radiating from the suture and becoming obsolete near the periphery, but absent from the last whorl; there are also a few faint, irregular, spiral markings, perhaps pathological; aperture ovate, outer lip thin, simple; body with a thin, whitish callus thicker on the pillar, which is arcuate, slightly reflected and with a very narrow umbilical chink open behind it; operculum dark brown, horny, with about two and one half whorls. Height of shell, 15.0; of last whorl, 14.0; of aperture, 11.5; max. diam. 11.5 mm.

U. S. S. "Albatross," station 3356, Gulf of Panama, in 546 fathoms, mud, bottom temperature 40°.1 F. U. S. N. Mus. 123,044. Also at station 3407, near the Galapagos Islands, in 885 fathoms, ooze, temperature 37°.2; station 3431, off Mazatlan, in 995 fathoms, mud, temperature 37°; and station 4654, 24 miles NW. of Aguja Point, Peru, in 1036 fathoms, mud, temperature 37°.3. The National collection also contains a full-grown specimen from southern Chile, in about south latitude 50°, which has about six whorls and measures 32 mm. in height and 28 mm. in maximum diameter. This specimen was collected by Dr. Crawford, and has a heavily callous pillar with a deep chink, but no actual perforation, behind it in the umbilical region. The greatest diameter is well up on the whorl, which gives the species a peculiar "shouldered" aspect.

Polinices (Euspira) pardoanus Dall, n. sp.

Shell small, with about four whorls, white with a straw-colored periostracum, depressed turbinate, smooth except for lines of growth and occasional obscure, irregular, slightly elevated spiral markings; spire (defective) probably blunt, the form of the shell rather wide and depressed; aperture ovate; outer lip thin, obliquely retractive, simple; body with a marked callus; pillar thick and rather wide behind, appressed against the upper part of the umbilicus, the thickened part narrower in front, terminating where an impressed spiral line starts at its entrance into the umbilical perforation near the anterior edge; umbilicus narrow, twisted; the margin of the aperture slightly thickened and compressed. Height (about), 13; of last whorl, 10; of aperture, 9; max. diam. 14 mm.

U. S. S. "Albatross," station 3361, in the Gulf of Panama, in 1471 fathoms, ooze, bottom temperature 36°.6 F. U. S. N. Mus. 123,046. Also at station 3407, near the Galapagos Islands, in 885 fathoms, ooze, temperature 36°.2 F., a young specimen apparently of the same species; and a worn but full-grown specimen at station 3366, off Cocos Island, Gulf of Panama, in 1067 fathoms, ooze, temperature 37°.0 F.

Although the apex of each specimen is more or less eroded, it is still evident that this is a particularly flattened species, which with its milk-white shell and yellowish periostracum is sufficiently characteristic. The suture is distinct, but neither appressed nor channelled, though, when eroded, the latter is apt to be simulated by a channel of erosion.

Polinices (Euspira) vaginatus Dall, n. sp.

This species is represented by a number of more or less defective specimens and is best described comparatively with *P. solutus* Gould.

The shell is white with an olivaceous periostracum; the spire is much flatter than in *P. solutus*; the furrow at the bottom of which the suture lies is wider and is not channelled; in the young the whorls have a "shouldered" aspect, but in the adult they are evenly rounded; the umbilicus is cylindrical and reaches nearly to the apex of the shell, in *solutus* it is barely a narrow chink behind the reflection of the pillar; there is a heavy callus on the body which is attenuated at the side of the umbilicus, while in *solutus* the callus is comparatively thin on the body and has a broad reflection nearly covering the narrow umbilicus. The shell has about four whorls, and an adult measures: alt. of shell, 22.0; of last whorl, 19.5; of aperture, 14.0; max. diam. 18.0 mm.

Stations 2778 and 2779, Magellan Strait, in 61 to 77 fathoms, ooze, bottom temperature 47° F. U. S. N. Mus. 97,126 and 106,873. Also at Laredo Bay in the strait.

After careful and repeated comparisons I cannot make this shell agree with any of those illustrated in Strebel's valuable account of the shells of this vicinity, and it is certainly not identical with the shell figured by Gould as his *Natica soluta*.

Polinices (Euspira) constrictus Dall, n. sp.

Shell solid, smooth except for lines of growth, polished white or grayish, having five and a half whorls; apex rather pointed, slightly elevated, with a closely appressed suture, immediately in front of which the whorl is slightly but distinctly constricted, beyond this the whorl is fully and evenly rounded; the edge of the whorl at the suture is vertically striated by the more emphatic incremental lines, but these striae do not pass in front of the constriction; under a good lens the entire surface is seen to be microscopically closely evenly striated; aperture ovate, outer lip thin and sharp, body with a thick callus, proximal end of the pillar heavily callous, but the callus, though partially overflowing the umbilicus, has no umbilical lobe or sulcus such as is seen in *Neverita*; anterior part of the pillar wide, depressed; umbilicus narrow, funicular, with a spiral impressed ascending line anteriorly. Alt. of shell, 20.0; of last whorl, 18.0; of aperture, 13.0; max. diam. 17.0 mm.

U. S. S. "Albatross," station 2780, Magellan Strait, in 369 fathoms, mud, bottom temperature 47°.0 F. U. S. N. Mus. 97,065.

An elegant little species having somewhat the aspect of a small *Neverita*.

Polinices (Euspira) litorinus Dall, n. sp.

Shell small, solid, depressed, with almost exactly the form of *Littorina palliata* Say, milk-white with a pale straw-colored periostracum, and about three and a half whorls; surface smooth, except for faint incremental and occasional obsolete spiral lines, not polished; suture distinct, almost appressed; whorls rounded; aperture ample, ovate; outer lip sharp, body with a heavy white callus, which extends downward and almost entirely fills the umbilicus, leaving only a minute fissure open; the umbilical region but slightly indented; operculum paucispiral, light brown, horny, of about two whorls, the nucleus in the anterior fourth of its total length. Alt. of shell, 9; of last whorl, 8.5; of aperture, 7.5; max. diam. 8.5 mm.

U. S. S. "Albatross," station 2807, near the Galapagos Islands, in 812 fathoms, ooze, bottom temperature 38°.4 F. U. S. N. Mus. 96,481.

This shell recalls *Natica impervia* Philippi, but is proportionately wider, and has a horny operculum, while according to Strebel Philippi's species belongs to Cryptonatica, having a smooth shelly operculum.

Polinices (Euspira) strebeli Dall, n. sp.

Shell small, thin, rotund, polished, smooth except for incremental lines, and a great variety of irregular scratches which are probably pathological; periostracum pale brownish; whorls about four and a half, rounded, with an almost appressed suture, of the normal form; aperture oval, outer lip thin, sharp; body with a thin callus arcuately indented behind, thick and spreading in the umbilical region, where the umbilicus is completely filled, leaving only a chink distally, which does not lead to a definite perforation; pillar-lip in front of the callus, thickened, pass, ing imperceptibly into the anterior and outer lips; operculum brown, two-whorled-horny, having a spirally striated glaze on the inner side and an elevated horny papilla at the nucleus. Alt. of shell, 12.0; of last whorl, 11.0; of aperture, 9.5; max. diam. 11.0 mm.

U. S. S. "Albatross," station 2783, off Southern Chile, in 122 fathoms, mud, bottom temperature 48°; station 2777, Magellan Strait, in 20 fathoms, gravel, and station 2808, near the Galapagos Islands, in 634 fathoms, coral sand, temperature 40°, the latter specimens fragmentary. Type, U. S. N. Mus. 97,093.

Rhipidoglossa.

Bathysciadiidae.

BATHYSCIADIUM Dautzenberg and Fischer.

Bathysciadium D. and F., Bull. Soc. Zool. de France, 1901, **24**, p. 207; type, *B. conicum* D. and F. l. c. (= *Lepeta costulata* Locard, Talisman Rep., Moll. Test., 1898, **2**, p. 96, pl. **5**, figs. 16, 17, 18).

Lepeta (sp.) Locard. Exp. Sci. Trav. et Tal., Moll. Test., 1898, **2**, p. 96.

The species upon which this genus was founded was dredged off the Azores, by the Prince of Monaco, in 1888, in about 780 fathoms.

The specimens were seated upon the remains of a Cephalopod beak; and, like the species from the Pacific about to be discussed, the several individuals had gnawed an excavation of the size of the base of the shell in the substance of their pedestal, over which they were seated.

The *B. costulatum* is described as extremely thin and furnished with membranous periostracum which does not appear to have been ciliated; the shell is sculptured with twenty radiating ribs which are very prominent, take origin about halfway up the cone of the shell and distally project prominently beyond the periphery of the base. The characteristics of the anatomy are described by Dr. Pelseneer, in a paper following the description above cited, from which it appears that the animal is without eyes, possesses two very short tentacles, and on the right side from the base of the right tentacle extends a rather long, pointed verge, grooved on the outer ventral side. The mouth contains a single unpaired jaw, and a long radula with the formula 1 · 4 · 0 · 4 · 1, the uncinal tooth being plate-like, and the third lateral larger than any of the others and furnished with a strong cusp. The rhachidian tooth is absent. The middle of the surface of the foot is produced or protruded, taking the form of the excavation upon which the animal rests. There are no gills either pallial or ctenidial, and Dr. Pelseneer believes that respiration is performed, as in Lepeta, by the surface of the mantle. The nervous system recalls that of the Docoglossate Limpets, there are two otocysts, each containing a single otolith.

The animal appears, unlike most of the true Limpets, to be hermaphrodite, possesses a heart with a single ventricle, two renal organs, and a large hepatic gland. Dr. Pelseneer concludes that the family belongs in the Docoglossa, to which so many of the anatomical characters point.

Desiring to have the most careful examination made of the Pacific species, specimens were sent to Dr. Johann Thiele, of the Royal Zoological Museum at Berlin, well known from his anatomical researches on Mollusca.[1] It will be noted that the *B. pacificum* is considerably larger than the Atlantic form, giving a better opportunity to the anatomist for studying the minor details.

Bathysciadium pacificum Dall, n. sp.

Plate 9, figures 1, 3, 7.

Shell small, circular, conical, in every case with the apex eroded but evidently central or slightly in advance of the centre; color whitish, with a smooth, polished, concentrically faintly striated surface, a rather thick chalky layer being originally situated on a porcellanous inner coat; on the exterior the periostracum has a rather remarkable disposition and character; there are about twenty radial lines upon the surface on which the periostracum is developed in long fringe-like hairs which are not a continuous series but constitute a line of successive whorls extending somewhat beyond the margin of the shell; these are divided usually into groups of five radii, the lateral radii have the whorls of hairs extremely long and abundant, especially beyond the margin, where, when the animal raises itself to admit water and food between the shell and its *situs*, these fringes cloak the sides so no sediment can enter between the shell and its pedestal; the anterior and posterior groups of radii have the whorls short, not extending much beyond the margin, thus by ciliary action an anterior incurrent and posterior excurrent flow is doubtless promoted; between the major radii in the wide interspaces there are in each case a pair of minor radii without whorls of hairs; these radii do not appear to cover any shelly ridges or ribs, the surface under them is not, in the specimens examined, perceptibly raised; the interior is porcellanous white, with a broad, strong muscular impression having a wide anterior hiatus; when the apex is not central it is more or less anterior to the centre. Diameter of average specimen, 5.0; height, 2.5 mm.

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[1] Dr. Thiele's results will appear separately in the Bulletin Mus. Comp. Zoology.

U. S. S. "Albatross," station 4656, off Sechura Bay, Peru, in S. Lat. 6° 55′ and W. Lon. 83° 34′, in 2222 fathoms, green mud, bottom temperature 35°.2 F. U. S. N. Mus. 110,570. Seated on cuttle beak, with Cocculina.

Another Cephalopod beak bearing similar excavations but no specimens was dredged off Aguja Point, Peru, at station 4654, in 1036 fathoms, mud, temperature 37°.3 F.

Cocculinidae.

COCCULINA DALL.

Cocculina DALL, Proc. U. S. N. Mus., 1881, p. 402; Bull. Mus. Comp. Zoöl., 1889, **18**, p. 345; type, *C. rathbuni* Dall, 1881.

This genus is represented in nearly all parts of the deep sea which have been explored.

Cocculina agassizii DALL, n. sp.

Shell small, white, covered with a strong light, olive-colored periostracum, beneath which it is chalky, ovate-quadrate, high, with the apex about the posterior third, and the anterior longer slope roundly arcuate; the periostracum is finely, closely, radially threaded, the threads seem to bear very short projecting hairs, but neither the threads nor the hairs appear to correspond to any sculpture of the shell; on drying, the periostracum immediately detached itself from the upper part of the shell, showing beneath it only very fine, irregularly concentric lines; toward the margin it seemed to be more closely attached to the shell and, by its contraction in drying, began at once to split the shell, obliging me to return it at once to the liquid from which it had been taken, or it would have gone to pieces entirely; interior of the shell smooth, white, with a broad, short, horseshoe shaped muscular impression with a wide anterior hiatus at about the anterior third of the length; nucleus small, bulbous, produced, hardly spiral, but decurved; the shell enlarges suddenly on entering the nepionic stage; animal as usual, with a single posterior epipodial filament on each side. Alt., 2.0; length, 3.5; width, 2.5 mm.

U. S. S. "Albatross," station 4630, Gulf of Panama, in 556 fathoms, sand, temperature 40°.5 F., on a fragment of wood. U. S. N. Mus. 110,660.

Cocculina nassa Dall, n. sp.

Plate 16, figures 3, 6.

Shell small, white, with a pale brownish periostracum, subquadrate, with the apex subcentral, the anterior slope slightly convexly arched, the posterior slope direct; apex eroded in all the specimens; sculpture of low, sharp, somewhat irregular concentric laminae, which have their height slightly increased by an added film of periostracum, and are stronger on the upper part of the cone; beside these there are fine lines of growth; the concentric sculpture is crossed by subequal fine radial threads extending from the apex to the margin, with few or no intercalaries; the radial threads are not laminar like the concentric sculpture, and near the apex are closer together, but diverge as they approach the margin, which is only crenulate by them in the adolescent stages; the intersections are not nodulous; interior polished, bluish white, the muscular impressions hardly visible. Length, 8.5; apex, 4.5 behind the anterior margin; breadth, 5.5; height, about 5.0 mm.

U. S. S. "Albatross," station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F. U. S. N. Mus. 123,053.

This species has the sharpest sculpture of any yet described. It is more elevated and relatively less arcuate than the preceding species, while none of the Atlantic species is so sharply reticulated.

Cocculina diomedae Dall, n. sp.

Plate 16, figures 4, 7.

Shell rather large for the genus, white with a pale straw-colored periostracum, depressed conic, somewhat parallel sided, with rounded ends, apex nearly central, eroded; margin thin, sharp, entire; interior bluish-white, polished, the muscular impressions strong. Lon. of shell, about 13.0; height, 4.5; length of posterior slope, 6.0; width of shell, 8.5 mm.

U. S. S. "Albatross," station 3393, Gulf of Panama, in 1020 fathoms, mud, bottom temperature 36°.8 F. U. S. N. Mus. 123,052.

This species in form and size closely resembles *C. rathbuni* of the Atlantic, but on examination with a good lens the fine radial striation of the latter (which is not represented on the figures of the species, being too fine for the enlargement) is entirely absent, the periostracum is less continuous and not shining, and of a greenish tint, while that of *C. rathbuni* inclines to brown.

Turbinidae.

TURBO Linne.

Turbo saxosus Wood.

A dead and broken specimen probably of this species was dredged near Cocos Island, at station 3368, in 66 fathoms, rocky bottom. U. S. N. Mus. 123,054.

This is a common and variable species from the Gulf of California to the Galapagos Islands.

LEPTOTHYRA Carpenter.

Leptothyra (Carpenter Ms.) Dall, Amer. Journ. Conch., 1871, **7**, p. 130; type, *Turbo sanguineus* L. New name for *Leptonyx* Carpenter, preoccupied in vertebrates.

Leptonyx Carpenter and Adams, Proc. Cal. Acad. Sci., 1864, **3**, p. 175; not of Gray, 1837.

Collonia Philippi, Handb. Conch., 1853, p. 206; not of Gray, 1852.

Cantrainea Jeffreys, P. Z. S. Lond., 1883, p. 109; type, *Trochus peloritanus* Cantraine; Monterosato, Nom. Conch. Medit., 1884, p. 49.

Cantraineia Fischer, Man. de Conch., 1885, p. 812.

Homalopoma Carpenter, Suppl. Rept. Brit. Assoc., 1863, pp. 588, 627, *olim.* for *Turbo sanguineus* Linné; name not validated, and withdrawn by Carpenter as preoccupied in Zoölogy.

The shell which Carpenter regarded as the *Turbo sanguineus* of Linné and upon which his genus was really based, is described by Pilsbry as a distinct (Californian) species under the name of *Leptothyra carpenteri*.

The *Anadema caelata* A. Adams was regarded as a subgenus of Omphalius by H. and A. Adams in 1854, but is considered to be a Leptothyra by Pilsbry. It has a very peculiar ample vaulted umbilicus and seems to me, though perhaps related to Leptothyra, to be sufficiently distinct to be retained. If not, the name would replace Leptothyra, having seventeen years priority, and not being, so far as I can discover, otherwise ineligible.

Leptothyra panamensis Dall, n. sp.

Plate 5, figure 9.

Shell large for the genus, white, brilliantly pearly within, covered with an opaque creamy white outer coat and a brilliantly polished translucent periostracum; apex eroded, followed by about three subsequent turbinate whorls; major spiral sculpture of three strong distant keels, of which one appears on the spire; close to the second the suture is laid, giving the effect of a very minute channel; on the last whorl the second is at the periphery and more distant from the first keel than from the third, which forms the margin of the base; the relative distances of these keels may vary somewhat with the individual; beside the keels the whole surface is covered with fine spiral threads with wider interspaces, there are about a dozen between the first and second keels; there is no axial sculpture except lines of growth; base rounded; aperture round except where angulated by the keels; body with a thin callus; pillar thickened, with a small obscure tooth at the anterior end, where the adjoining lip is slightly patulous; outer lip simple, throat pearly, smooth; operculum lost. Height, 9.5; height of aperture, 5.5; max. diam. 11.0 mm.

U. S. S. "Albatross," station 3358, Gulf of Panama, in 555 fathoms, sand, bottom temperature 40°.2 F. U. S. N. Mus. 123,055.

This species is closest to *L. carinata* Cantraine, var. *tricingulata* Locard, of the Atlantic, from which it is most easily distinguished by its thinner shell and three sharp and elevated instead of blunt and low spiral keels.

These shells appear to be somewhat confused, and a little discussion of their characters may throw some light on the subject. A sketch of the synonymy may be prefixed to the other data.

Leptothyra peloritana (CANTRAINE) s. s.

Turbo peloritanus Cantraine, Bull. Roy. Acad. Sci. Belg., 1836, **2**, p. 387; Nouv. Mém. Roy. Acad. Sci. de Belgique, 1841, **13**, pl. **6**. fig. 22.

Trochus filosus Philippi, En. Moll. Sicil., 1844, **2**, p. 155, pl. **25**, fig. 24 (not *Trochus filosus* Wood, 1828), Bronn. Ind. Pal., 1848, **3**, p. 1300.

Cantrainea peloritana Jeffreys, P. Z. S., 1883, p. 108.

Leptothyra carinata, var. *peloritana* Pilsbry, in Tryon, Man., 1888, **10**, p. 252, pl. **63**, fig. 24 (figure copied from Cantraine).

Leptothyra filosa Dautzenberg and Fischer, Mém. Soc. Zool. de France, 1896, **9**, p. 473.

Turbo peloritanus Locard, Exp. du Travailleur et du Talisman, Moll. Test., 1898, **2**, p. 17, **1**, pl. **21**, fig. 31–32 (with variety *cingulata* Locard. The variety is identical with *T. filosus* Philippi).

Leptothyra peloritana var. **glabrata** PHILIPPI.

Turbo carinatus Cantraine, Bull. Roy. Acad. Sci. Belg., 1836, **2**, p. 387 (not *Turbo carinatus* Sowerby, 1821); Mal. Medit. in Nouv. Mém. de l'Acad. Belg., 1841, **13**, pl. **6**, fig. 23.

Trochus glabratus Philippi, En. Moll. Sic., 1844, **2**, p. 226, pl. **28**, fig. 10; Bronn. Ind. Pal., 1848, **3**, p. 1301.

Turbo erythrinus Galvani (fide Seguenza) in Nuovo Ann. d. Sc. nat. Bologna, 1845, 2d ser., p. 129.

Cantrainea peloritana, var. *carinata* Jeffreys, P. Z. S. Lond., 1883, p. 108; Monterosato, Nom. Conch. Medit., 1884, p. 49.

Leptothyra carinata Pilsbry in Tryon, Man., 1888, **10**, p. 252, pl. **63**, fig. 35 (figure copied from Cantraine).

Turbo peloritanus varieties *major*, *minor*, *depressa*, *alta*, *tricingulata*, *attenuata*, and *angulosa* Locard, Exp. du Trav. et du Talisman, Moll. Test., 1898, **2**, p. 18, 1897, **1**, pl. **21**, figures 28, 29, 30, 33, 34, 35, 36 (these varieties are all mutations of the original *T. carinatus*).

In the Jeffreys collection we have a fine series of this species both recent and fossil, as well as a large series of the *Leptothyra albida* Dall, from various localities in the vicinity of the West Indies, dredged by the "Albatross," "Blake," and others.

That the *carinatus* Cantraine is merely one of the numerous mutations of *peloritanus* (or *vice versa*) is not only shown by the measurements and figures given by Cantraine, but is generally admitted by naturalists familiar with the species.

I have not seen the unique specimen of *Leptothyra induta* Watson, figured in the "Challenger" report, but none of the specimens of either *albida* or *peloritana* have the beaded nepionic sculpture or the puckered folds in front of the suture shown in the figure of *induta*. The measurements, moreover, show that *induta* cannot be conspecific with *peloritana* in any of its mutations. I am inclined to believe that *induta* is a good species and distinct from *albida*, which does not show in any of its mutations the characteristics described and figured by Watson. It is, however, a fact, and probably accounts for the confusion in the literature, that *L. albida* Dall occurs in the Italian Pliocene with *L. peloritana*, and was sent to Jeffreys by Seguenza as a possible variety of *peloritana*. These specimens are now in the National Museum, and, with the series I have spoken of for comparison, are indubitably distinct from the others.

The average measurements of the three forms referred to are as follows, in millimeters:

Species.	Height.	Max. breadth.	
L. peloritana	14.00	14.62	(all varieties)
L. induta	6.75	6.25	(one specimen)
L. albida	7.00	7.50	(27 specimens)

The recent *peloritana* seem to tend to less height, greater width, and larger size than the fossils. In *albida* there is no great variation in sculpture, unlike *peloritana*.

Liotiidae.

LIOTIA Gray.

Liotia (Arene) californica Dall, n. sp.

Shell large for the genus, rude, yellowish-white, depressed, with about six whorls, carrying at the shoulder six blunt, large, projecting tubercles; nucleus small, the nepionic whorls reticulate, flattened; the later whorls keeled bluntly at the shoulder, behind which they are flattened; on the flat area are two strong, elevated, spiral threads (which later disappear) close together, with the channels on either side reticulated by subequal and subequally spaced radial threads; on the last whorl all the sculpture on the upper part of the whorl, except the keel connecting the tubercles at the shoulder, has disappeared; the surface of the shell is of a spongy nature and all the sculpture is obscure as if deliquescent; the base is rounded with a large spiral, deep umbilicus, having one entering spiral keel which ends at a projection of the pillar lip; the verge of the umbilicus is rounded and spongy, outside of this ridge in the young it is constricted by a row of pits between which and the periphery are some obscure spirals in some specimens; aperture circular within, and when fresh brilliantly pearly, but the pearly coating is very thin and seems to disappear in dead shells; the outer margin of the aperture, which is very thick, is modified by the umbilical keel and other sculpture; operculum multispiral, with the external edges of the whorls fringed, very concave, and showing hardly any calcareous deposit. Alt. of adult, 15.0; of aperture, 9.0; max. diam. 23.0; min. diam. of base, 15.0; umbilicus, 3.0 mm.

U. S. S. "Albatross," station 2984, off Lower California, in 113 fathoms, sand, bottom temperature 49°.8 F. U. S. N. Mus. 110,662.

This species is usually covered with Polyzoa, Lithothamnion, and other adherent matter, which obscures its appearance, but the shell itself is so rude, spongy, and bleached in appearance that the actual surface is often discriminated only when examined with a lens. It is the largest species of its group and the first to be reported from the region, though there are several small species of typical Liotia named by Carpenter from Mazatlan and the Gulf, as well as the coast of Alta California.

Liotia (Arene) pacis Dall, n. sp.

This species is so similar to the preceding that it is best described by a comparative diagnosis.

Than *L. californica* it is smaller, flatter, and more distinctly sculptured; the specimens examined have three and a half whorls beside the (lost) nucleus; it has eight peripheral projections instead of six, and they are flat, triangular, and spinose instead of bluntly tubercular; each projection is at the distal end of a distinct radial rib; the base is flatter, the umbilical ridge lower, and broken up into obliquely radial tubercles without any row of pits outside of it; the aperture is subcircular and the discrepancy between the inner and outer margins much less than in *californica*. Alt. of shell, 10.0; of aperture, 6.0; max. diam. of base, 15.0; min. diam. 11.0 mm.

U. S. S. "Albatross," station 2996, off La Paz Bay, Lower California, in 112 fathoms, mud, bottom temperature 56° F. U. S. N. Mus. 110,663.

Trochidae.

CLANCULUS Montfort.

Panocochlea Dall, subg. nov.

Shell depressed-conic, aperture very oblique, the outer lip produced at the periphery; a single, strong tooth at the end of the pillar with a sulcus in front of it, a layer of smooth enamel, continuous with that of the outer lip, spread over the umbilical region (which is without pit or perforation) and a large part of the body whorl; throat, pillar, and body smooth without liration. Type, *P. rubida* Dall.

Clanculus (Panocochlea) rubidus Dall, n. sp.

Plate 8, figures 3, 4.

The two specimens described below are believed to be young and adult of the same species, though in one case the color of the external shell is rose-pink and in the other brick-red or dull vermilion. Unfortunately the condition of the fragmentary adult is so extremely fragile, owing to decay, that it could not be entrusted to an artist for illustration, and the characters of the aperture in the adult are not shown in the figures of the young. Neither specimen contained the operculum or soft parts, but there is little doubt that the two specimens are conspecific. The shell appears to occupy in the system a place half-way between the Oriental Clanculus and the South American Monodonta, but rather nearer to the former.

Young shell small, pearly, with an opaque outer coat, and about four and a half whorls; above rose-pink, whitish at the apex, base cream-colored; form depressed turbinate; nucleus smooth, very minute, globular, followed by one and a half similar turns; the succeeding whorl rounded, gradually becoming flattish above, with a single, small, simple peripheral keel, the sculpture then gradually taking on the adult characters and the pinkish color; suture narrow, applied midway between the peripheral and next posterior keel, deeply channelled, with its anterior margin beaded; spiral sculpture on the last whorl of four, prominent, more or less distinctly beaded keels, one close to the beaded sutural margin, the next separated by a much wider space, the next two nearer, equidistant, the first peripheral, and the second at the margin of the evenly rounded base; the keels are more or less articulated by crimson dots; the whole surface is also finely spirally striated; axial sculpture only of incremental lines somewhat intensified at intervals; aperture rounded, very oblique, outer lip thin, sharp, a little crenulated by the keels; body with a wash of callus; pillar arcuate, short, very thick, with a prominent basal tooth, the axis imperforate. Height of shell, 4; of aperture, 2.5; max. diam. 6 mm.

U. S. S. "Albatross," station 3355, Gulf of Panama, in 182 fathoms, mud, bottom temperature 54°.1 F. U. S. N. Mus. 122,953.

Adult fragment. Specimen broken, but showing the characters sufficiently for description; general form depressed-turbinate, with four and a half whorls; color brick-red, paler on the prominences; suture closely appressed to a peripheral keel, which on the spire is smooth, on the last whorl undulate; the sutural margin of the last whorl is marked by a very strong, low, coarsely beaded spiral rib, in front of which the whorl is very flatly arched to the periphery; on this surface are six or seven rather strong beaded threads similar to that forming the periphery, their intervals appear irregular and contain many extremely fine, obscure, spiral threads; base forming an imperforate flattened dome, with one spiral thread near the periphery, and numerous finer, obscure, spiral lirulae over the rest of the surface; aperture extremely oblique, outer lip produced along the suture, retractively arcuate between suture and periphery, produced and patulous at the periphery, thence obliquely arcuate to the base of the pillar; it is everywhere simple, smooth, not reflected, but loaded with a heavy layer of callus, which is also spread evenly and smoothly over the body and about two-thirds of the base; pillar extremely short, flattened, produced in a single large, flattened, heavy tooth, with a deeply excavated notch between the tooth and the anterior margin of the aperture; the callus entirely covers and conceals the umbilical depression if any existed. Height, 7.0; of aperture, 3.5; max. diam. about 15.0 mm.

U. S. S. "Albatross," station 3396, Gulf of Panama, in 259 fathoms, mud, bottom temperature 47°.4 F. U. S. N. Mus. 122,954.

The interior of the shell was once pearly, but has been dulled by decay. It is impossible at present to say whether the broad mass of callus on the base was originally opaque white or pearly.

GAZA Watson.

Gaza Watson, Journ. Linn. Soc., 1879, **14**, p. 601; Challenger Report, *Gastropoda*, 1885, p. 93; type, *Gaza daedala* Watson, *op. cit.*

Gaza rathbuni Dall.

Plate 2, figure 4; plate 3, figure 6.

Gaza rathbuni Dall, Bull. Mus. Comp. Zoöl., June, 1889, **18**, p. 354; Proc. U. S. Nat. Mus., 1889, **12**, p. 342, pl. **7**, fig. 4 (immature).

U. S. S. "Albatross," station 2818, near the Galapagos Islands, in 392 fathoms, sand, bottom temperature 44° F. Also at station 3402, in 421 fathoms, ooze, temperature 42°.3, in the same vicinity. U. S. N. Mus. 122,955.

The original specimen was immature, not having formed the reflected lip. The species has therefore been refigured from the present material.

An additional note may be made that the nuclear whorls of all the species of Gaza which I have examined have a membranous consistency, so that when the shell has dried the nucleus shrivels up and drops off, leaving a cylindrical perforation which is continuous with the umbilicus.

The dimensions of the adult shell are: alt. 32; of last whorl, 28; of aperture, (vertical), 23; max. diam. of base, 45; min. diam. 38 mm.

The periostracum is olivaceous, polished, very thin, and readily dehiscent. In Watson's type it had, doubtless, been lost, thus accounting for his observation that it was wanting in *G. daedala*.

This genus affords, perhaps, the most exquisite gems of the abyssal shell fauna; in shape and iridescence nothing more lovely can be imagined.

CALLIOSTOMA Swainson.

Calliostoma iridium Dall.

Plate 19, figure 5.

Calliostoma iridium Dall, Proc. U. S. Nat. Mus., 1895, **18**, p. 7; 1902, **24**, p. 552, pl. **39**, fig. 3.

U. S. S. "Albatross," station 3387, Gulf of Panama, in 127 fathoms, sand, bottom temperature 56°.2 F. U. S. N. Mus. 122,957; and at station 3391, in 153 fathoms, mud, temperature 55°.8 F.

Color of the shell a waxy pink, the apex somewhat darker, with variable delicate brown flammules and darker brown ones on the periphery of the last whorl. The base is destitute of flammules and the pillar is white. In this, as in most shells not from the littoral region, the delicate colors are more or less evanescent. The nacre is very bright, especially when the shell is wet, showing through the translucent outer coat. The operculum is pale yellow, concave externally with an entire edge and about a dozen whorls.

TURCICULA Dall.

Turcicula Dall, Bull. Mus. Comp. Zoöl., 1881, **9**, p. 42; type, *Margarita* (*Turcicula*) *imperialis* Dall, *l. c.*; *Ibid.*, June, 1889, **18**, p. 376, pl. **22**, figs. 1, 1a; Pilsbry in Tryon, Man. Conch., 1889, **11**, pp. 14, 330; Dall, Bull. U. S. Nat. Mus., 1889, **12**, p. 162, pl. **22**, figs. 1, 1a; Locard, Exp. du Trav. et du Talisman, Moll. Test., 1898, **2**, p. 21.

Bembix Watson, Journ. Linn. Soc. London, 1879, **14**, p. 603; Type, *B. aeola* Watson, *op. cit.*, p. 603; Challenger Rep., *Gastropoda*, 1886, p. 95, pl. **7**, fig. 13; Japan; not *Bembix* De Koninck, 1844.

Bathybembix Crosse, Journ. de Conchyl, 1893, **40**, p. 288, new name for *Bembix* Watson, not De Koninck (the number, ostensibly for July, 1892, did not appear until March, 1893).

This group, at first instituted as a subgenus of Margarita, is now generally admitted to be of generic rank. It is not only represented by characteristic species in the Atlantic, eastern Pacific and Japanese seas, but is also known from the Tertiary of the Pacific Coast of North America, characteristic species being known from the Eocene and Oligocene.

The type species of Bembix Watson, not De Koninck, was established on a comparatively young shell from Japanese seas, but the adult has recently been figured by Schepman (Leyden Museum Notes, 1905, **25**, p. 100, pl. **8**, figs. 4, 5), and the "Albatross," having dredged in Japanese waters a number of specimens of this species, of various ages, I was enabled, by the kind assistance of Mr. Edgar A. Smith of the British Museum, to confirm the decision of Schepman as to the identity of his shell with the adult *B. aeola*.

The species of this group now recognized among recent shells are as follows:

ATLANTIC OCEAN.

Turcicula imperialis Dall.
Turcicula miranda Dautzenberg and Fischer.

EASTERN PACIFIC.

T. macdonaldi Dall.
T. bairdii Dall.

WESTERN PACIFIC, ETC.

T. crumpii Pilsbry.
T. aeola Watson.
T. argenteonitens Lischke.

OLIGOCENE OF WASHINGTON.

T. washingtoniana Dall.

EOCENE OF OREGON.

T. columbiana Dall.

Turcicula macdonaldi DALL.

Plate 19, figure 7.

Turcicula macdonaldi Dall, Proc. U. S. Nat. Mus., 1889, **12**, p. 348, pl. **7**, fig. 7.

U. S. S. "Albatross," station 2792, off Manta, Ecuador, in 401 fathoms, mud, bottom temperature 43° F; also at station 3356, Gulf of Panama, in 546 fathoms, mud, bottom temperature 40°.1 F. U. S. N. Mus. 122,958.

This is the largest and finest recent species yet described.

The species of Turcicula are found at considerable depths in the tropics and warm temperate zone, but in the cold waters of Bering Sea, *Turcicula bairdii* has recently been dredged by the "Albatross" in 25 fathoms, but always in the offshore fauna. No species has yet been described from any part of the shore fauna properly so called, and even the Miocene fauna of Oregon, where it might reasonably have been expected to occur, is without it, the assembly in that horizon being a shallow water coast fauna.

While the type of sculpture characteristic of *Turcicula* is also found in many other deep water Trochids, the species can easily be discriminated from the Solariellas which are its next allies by its imperforate base with no umbilical depression.

SOLARIELLA SEARLES WOOD.

Solariella nuda DALL.

Plate 3, figures 5, 7.

Solariella nuda Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 9.

Shell turbinate, recalling Margarites, smooth, polished, except for obscure spiral markings which do not interrupt the surface, of about four whorls; color white, with a pink or blue nacre glowing through; whorls rounded, flattened in front of the suture; base rounded; umbilical margin keeled; umbilicus wide, funicular; aperture rounded, oblique, hardly angulate by the umbilical rib, and with a very short interruption between the inner and outer lips; operculum light brown, thin, with about ten whorls. Height, 15; major diam. 19; minor diam. 15.5 mm.

U. S. S. "Albatross," stations 2928 (in Lat. 32° 47′ N.); 3187 (Lat. 36° 14′ N.); and 3348 (Lat. 39° 03′ N.) off the coast of California, in 417, 298, and 455 fathoms, respectively on sandy or muddy bottom, temperature ranging from 41° to 47°.6 F. Also at station 2992, off Clarion Island, in 460 fathoms, sand, temperature 41°.8, and off the Santa Barbara Islands in 414 fathoms at station 2839, temperature 41°.4. Type, U. S. N. Mus. 122,580.

The operculum is thin, pale yellow and multi-spiral. The shell is remarkable on account of its total absence of ornament.

Solariella ceratophora Dall.

Plate 3, figure 2.

Solariella ceratophora Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 9.

Shell thin, with a pale olive, silky epidermis, and six whorls beside the (decollate) nucleus; early whorls smooth, gradually taking on two rows of projecting points or sharp nodules, which are, on the later whorls, connected by a slender spiral thread; periphery with a slender granular thread, on which the suture is laid; base with five similar threads, closer as they approach the umbilicus; umbilicus small, vertically striate; aperture rounded, slightly angulated by the sculpture; the outer lip thin, sharp; the inner reflected over part of the umbilicus. Height, 28; diam. 24 mm. The operculum has four or five whorls.

U. S. S. "Albatross," station 3432 in the Gulf of California, off La Paz, Mexico, in 1,421 fathoms, mud, bottom temperature 37°.8 F. U. S. N. Mus. 122,960.

The single specimen obtained has repaired an injury of the base so as to somewhat distort the umbilical region. Except for the presence of an umbilicus this might well be referred to Turcicula. A few fragments, probably of this species, were dredged at station 3431, off Mazatlan, Mexico, in 995 fathoms, mud, temperature 37° F.

Solariella galapagana Dall n. sp.

Plate 4, figure 2.

Shell turbinate, thin, creamy white with a fine greenish nacre showing through, with a globular large smooth nucleus and four and a quarter subsequent whorls; first nepionic whorl with two sharp spiral keels, one at the shoulder and one at the periphery, and two faint threads between the shoulder and the preceding suture; these are crossed by subequal, fine, sharp, somewhat protractive axial threads, at first small and crowded, but becoming more distant, subequidistant, and sharp as the whorl grows; the spirals increase by intercalation, and on the second whorl the axial threads begin to fade out, until they are reduced to beadings on the spirals between the suture and shoulder, and finally on the last whorl the spiral next the suture alone is beaded, and the peripheral major spirals have increased to six, while on the slightly flattened base there are about eighteen, close-set, even, gradually diminishing in size toward the umbilicus, which is bordered by a small sulcus, inside of which is a square-topped keel of two threads notching the margin of the aperture where they intersect it; inside of this is a twisted funicular umbilicus with one entering spiral thread on its walls, also ending in a small notch at the aperture; mouth rounded except at the notches; outer lip sharp, thin, crenulated by the spirals; pillar thin, arcuate, slightly reflected; whorls rounded except where slightly turrited by the shoulder keel; operculum thin, brownish, concave, many whorled, the margins of the whorls projecting as laminae from the surface externally. Alt. of shell, 17; of last whorl, 13; of aperture, 8.5; max. diam. 15.5; min. diam. of base, 13.5 mm.

U. S. S. "Albatross," station 3413, near the Galapagos Islands, in 1360 fathoms, ooze, bottom temperature 36°F. U. S. N. Mus. 122,959.

This elegant little shell is well distinguished by its sculpture from any of the allied species. It is perhaps not quite mature, and the pillar lip in the fully adult shell may be somewhat modified.

Solariella equatorialis Dall, n. sp.

Plate 5, figure 11.

Shell thin, pearly, the nacre shining through the translucent outer coating, and a pale yellowish, axially striated, silky periostracum; whorls six, exclusive of the (lost) nucleus; suture distinct, not channelled; whorl in front of it horizontal with a fine spiral thread at a short distance, giving a somewhat tabulate effect; somewhat more distant is a second stronger thread at the shoulder, and a similar one at the periphery, while a fourth forms the margin of the base against which the suture is laid; on the base are four more similar threads, becoming gradually more adjacent and feebly beaded or nearly simple, except the fourth, which is distinctly, minutely beaded, while a fifth, forming the brink of the large, wide, and deep umbilicus, is even more strongly beaded; axial sculpture of minute, feeble, radial wrinkles which at their intersection with the posterior thread crenulate it, and on the second and third threads produce, at intervals of about a millimeter, sharp, triangular, subspinose nodules; the entire shell is covered with axial, fine, retractive, silky striation; whorls full, base rounded; umbilicus very deep, funicular, the walls axially striated; aperture rounded-quadrate, the margins thin; pillar oblique, slightly excavated, not callous, slightly expanded; body and throat pearly. Alt. 21; of last whorl, 14; of aperture, 8.5; max. diam. of shell, 19.5; of umbilicus, 5.5 mm.

U. S. S. "Albatross," station 3376, off the Ecuador coast, in 1132 fathoms, ooze, bottom temperature 36°.3 F. U. S. N. Mus. 125,964. Also at station 3375, south of Malpelo Island, Gulf of Panama, in 1201 fathoms, ooze, temperature 36°.6; and station 3366, off Cocos Island, in 1067 fathoms, ooze, temperature 37° F. A fragment, taken off Mazatlan, at station 3421, in 995 fathoms, mud, may possibly belong to this species.

GANESA Jeffreys.

? Ganesa panamensis Dall.

Plate 19, figure 4.

Ganesa? panamensis Dall, Proc. U. S. Nat. Mus., 1902, **24**, p. 554.

Shell small, turbinate, smooth, whitish with a few grayish flecks and streaks which may not be normal to the shell, and about three and a half turgid whorls; nucleus eroded, apparently large and subglobular; subsequent whorls polished, smooth except for faint incremental lines, and a line at the anterior edge of the suture, caused by the appression of the edge of the whorl but which looks like a spiral thread; on the base around a very small, oblique, chink-like umbilicus there are spiral striae, much as in Mölleria, to the number of twelve to fifteen; base rounded; aperture nearly rounded, slightly angular at the posterior commissure; outer lip sharp, thin, simple; a thin wash of callus on the body; pillar-lip concavely arcuate, slightly thickened, passing imperceptibly into the anterior margin of the aperture; throat slightly pearly, smooth, without liration or opercular ledge such as is found in Mölleria. Operculum horny, thin, smooth outside, concave, with about four whorls. Alt. of shell, 4.7; of last whorl, 4.3; of aperture, 3.2; max. diam. of base, 4.5 mm.

U. S. S. "Albatross," station 3393, in 1020 fathoms, mud; Gulf of Panama, bottom temperature 36°.8 F. U. S. N. Mus. 109,029.

The position of Ganesa Jeffreys is more or less uncertain, but the present shell, though larger, resembles in general the species which Jeffreys included in his group; and there seems to be no other group defined into which this little shell would fit more appropriately.

Fissurellidae.

Emarginulinae.

PUNCTURELLA Lowe.

Cranopsis A. Adams.

Cranopsis A. Adams, Ann. Mag. N. Hist., 1860, ser. 3, **5**, p. 602 (type, *C. pelex* Adams); Fischer, Man. de Conchyl., 1887, p. 862; Dall, Blake Report, Gastr., 1889, p. 404; Pilsbry, in Tryon, Man., 1890, **12**, pp. 202, 240.

Puncturella (Cranopsis) expansa Dall.

Plate 4, figures 5, 10, 11.

Rimula? expansa Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 10.

Shell low, rounded, expanded; apex small, prominent, subcentral, recurved to the right; foramen like an exclamation point without the dot (!), the small end anterior, the suture in front of the foramen inconspicuous, marked by a narrow raised line on the interior of the shell; anterior slope convex, gently rounded; posterior a little excavated; sculpture of evenly spaced, similar, close, fine, rounded threads overrunning radiating, rounded, little elevated threads of three sizes, the larger starting at the apex, the others intercalary toward the periphery as the interspaces widen; margin of the shell slightly crenulated by the sculpture; interior smooth, yellowish white, the septum convexly arched without buttresses. Height, 10; length, 32; width, 26 mm.

U. S. S. "Albatross," station 3358, Gulf of Panama, in 555 fathoms, sand, bottom temperature 40°.2 F.; and station 3407, off the Galapagos Islands, in 885 fathoms, ooze, bottom temperature 37°.2 F. U. S. N. Mus. 122,966 and 122,967, the latter being the figured type.

This species recalls *P. asturiana* Fischer, but is larger, lower, and more expanded, a thinner shell, and with more delicate sculpture.

This appears to be the largest species of the genus yet described. A verge is present at the seat of the right tentacle in male specimens.

ISOPLEURA.

POLYPLACOPHORA.

Eochitonia Dall, 1889.

Lepidopleuridae.

LEPIDOPLEURUS Risso.

Lepidopleurus (Risso) Hist. Nat. Eur. Merid., 1826, **4**, p. 267; not of Carpenter, 1863.

Leptochiton, Gray, P. Z. S. Lond., 1847, p. 127; Carpenter (Ms.) Dall, Proc. U. S. Nat. Mus., 1878, **1**, p. 314.

Lepidopleurus Sars, Moll. Reg. Arct. Norv., 1878, p. 110; Pilsbry, Mon. Polyplacophora, 1892, p. 2.

The chitons of the deep sea and archibenthal regions almost exclusively belong to the present genus, and present an extremely uniform appearance.

Lepidopleurus halistreptus, Dall.

Lepidopleurus halistreptus Dall, Proc. U. S. N. Mus., 1902, **24**, p. 556.

U. S. S. "Albatross," station 3415, off Acapulco, Mexico, in 1879 fathoms, ooze, bottom temperature 36° F. U. S. N. Mus. 109,032; station 3417, in 493 fathoms, mud, temperature 40°; and station 3418, in 660 fathoms, mud, temperature 39°.

The specimen from deepest water, the type of the species, has the valves wider in a fore-and-aft direction and more distinctly mucronate than those from the other two stations.

The type has the first intermediate valve in front of the tail-valve with an axial length of 5.6 mm., a basal width of 10 mm., and an altitude above that base line of 4.5 mm.

The corresponding measurements from a specimen from station 3417 are 4.5, 10.0, and 3.5 mm.; and from station 3318, 3.5, 9.6, and 3.5 mm. It is obvious that the shallow-water specimens have the intermediate valves shorter and less elevated mesially and consequently a less angular back; there is also a pair of impressed lines which tend to differentiate the jugal from the pleural tracts. The measurements of the tail-valves did not differ like those of the intermediate valves. I was unable to discern any further differences, but, if those above indicated are held to have any systematic weight, the shallow-water specimens might be considered as a variety *abbreviatus*.

Lepidopleurus opacus Dall, n. sp.

Animal elongate, with a rather high subangular dorsum, a dirty-white coloration, and a narrow girdle closely set with very minute spinules, but with no marginal fringe of spines; the jugal is not perceptibly marked off from the pleural areas, and the lateral areas are only indicated by a feeble radial depression sometimes hardly visible; the sculpture consists of very minute ovate, flat, close-set granulations, like scales, obscurely arranged radiately with reference to the mucro, but otherwise uniform over the whole exterior of the valves; posterior valve with the jugum slightly arcuate longitudinally, ending in a prominent subcentral mucro; the posterior area slightly depressed, the sutural plates short, anteriorly directed, with an inclination of 45° laterally; interior white; intermediate valves with a wide sinus, short sutural plates, and an almost obsolete notch; anterior plate small, semilunate, simple; penultimate plate on the jugum 7.2 mm. long; base 10 mm.; alt. 6.0 mm.

U. S. S. "Albatross," station 4647, between the Galapagos Islands and the Peruvian coast, in 2005 fathoms, ooze, bottom temperature 35°.4 F. U. S. N. Mus. 110,664. Also at station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F.

This species is perhaps nearest to *L. mesogonus* Dall, from the Pacific Ocean, west of the Queen Charlotte Islands, in 1588 fathoms; that species is, however, even more angular dorsally, has the posterior mucro nearer to the posterior margin, and has the lateral areas of the intermediate valves prominently concentrically rippled.

Lepidopleurus incongruus Dall, n. sp.

Animal with the gills forming a very short posterior row; girdle narrow with extremely minute, close-set spines, giving the effect of a naked, velvety surface. Intermediate valves pale brown, the median line slightly obtusely angular; jugum slightly mucronate behind, the jugal area sculptured with very fine, close-set, rounded, longitudinal threads; pleural tracts with ten or twelve larger threads with wider, flat interspaces, the threads sometimes breaking off abruptly, leaving a double-width interval the rest of the way; lateral areas prominent, very finely granulose, conspicuously concentrically rippled; anterior plate with feeble concentric ripples and similar granulation; posterior valve with prominent subcentral mucro, the central area sculptured like the pleural tracts of the preceding valves, the posterior area like the anterior valve; penultimate valve with a length of 2.3, a width of 6.0, and an altitude of 2.5 mm. Articulations as usual in the genus.

U. S. S. "Albatross," station 3354, Gulf of Panama, in 322 fathoms, mud, bottom temperature 46° F. U. S. N. Mus. 122,969.

This species appears to have a unique sculpture. An examination of the valves figured in Pilsbry's monograph for the whole family reveals none like it.

Lepidopleurus luridus Dall.

Lepidopleurus luridus Dall, Proc. U. S. Nat. Mus., 1902, **24**, p. 556.

U. S. S. "Albatross," station 3392, in Panama Bay, in 1270 fathoms, hard bottom, temperature 36°.4 F.; and station 3393, in 1020 fathoms, mud, temperature 36°.8. U. S. N. Mus. 109,027.

Lepidopleurus farallonis Dall.

Lepidopleurus farallonis Dall, Proc. U. S. Nat. Mus., 1902, **24**, p. 557.

U. S. S. "Albatross," station 3104, near the Farallones Islands, off San Francisco, California, in 391 fathoms, coral, bottom temperature 41° F.; U. S. N. Mus. 109,025; and at station 3393, Panama Bay, in 1020 fathoms, mud, temperature 36°.8 F.

Mesochitonia.

Chitonidae.

CALLISTOCHITON Carpenter.

Callistochiton periconis Dall, n. sp.

Animal small, of a pale brownish color with a narrow dark girdle covered with small, closely packed setose scales; middle valves with the sculpture of *C. pulchellus*

(Gray) Pilsbry, from Peru, but differing in the following particulars: the posterior ribs of the middle valves are transversely striate, not nodular, and do not serrate the suture; the anterior valve has thirteen rounded finely cross-striated ribs, the posterior has seven; this valve considerably overhangs the posterior part of the girdle, and the two anterior ribs are conspicuously larger and stronger than the five between them. The gills are prolonged, reaching the second valve.

Perico Island, Panama Bay, collected on the reefs by the "Albatross" party. U. S. N. Mus. 110,763.

CHITON Linné.

Chiton (Chiton), sp. indet.

A small species of the restricted group of true chitons was obtained at Taboguilla Island, Panama Bay. It cannot be identified with any of the known species from this locality, but the specimens may prove to be immature, and therefore it seems best to leave it for the present anonymous.

SCHNOCHITON Gray.

LEPIDOZONA Pilsbry.

Ischnochiton ophioderma Dall, n. sp.

Shell blackish or brown with blackish, usually on the central areas longitudinally disposed flecks; interior dark bluish green, with an olivaceous flush under the mucrones; anterior and posterior valves each with ten rather deep, sharply defined, narrow slits; middle valves with one slit on each side; girdle with numerous large, ovate, close-set, imbricated convex scales, smaller toward the periphery; sutural plates large, the sinus indistinct; sculpture of the central areas minutely quincuncially reticulate, but to the naked eye smooth; at the margin of the lateral areas the lines become stronger, forming as it were a narrow sculptured fringe just in front of the lateral areas; the latter, as well as the whole of the anterior plate and the posterior area of the posterior plate, are covered with rounded close-set low projections resembling scales; there are no radial ribs or ridges on any of the valves. Lon. of shell, 12; lat., 9; alt. of median ridge, about 2 mm.

On the shore at Perico Island, Panama Bay. U. S. N. Mus. 110,764.

The sculpture of this shell is quite remarkable. I do not remember seeing anything like it in any other Chiton.

This and a few other species were obtained on the reefs or near the shore by the "Albatross" party.

Mopaliidae.

PLACIPHORELLA Carpenter.

Placiphorella blainvillei Broderip.

Chiton blainvillei Broderip, P. Z. S. Lond., 1832, p. 27; Reeve, Conch. Icon., Mon. *Chiton*, pl. **3**, fig. 13.
Mopalia blainvillei Gray, P. Z. S. Lond., 1847, p. 69.
Placiphorella blainvillei Dall, Proc. U. S. Nat. Mus., 1886, **9**, pp. 210, 211; Pilsbry, in Tryon, Man., 1892, **14**, p. 310, pl. **66**, figs. 26–32.

U. S. S. "Albatross," station 3368, near Cocos Island, Gulf of Panama, in 66 fathoms, rocky bottom; U. S. N. Mus. 122,968. Original locality of the species Lobos de Tierra Island, Peru, on a stone from seventeen fathoms (Cuming).

SCAPHOPODA.

SOLENOCONCHIA.

Dentaliidae.

Dentalium megathyris Dall.

Plate 19, figure 1.

Dentalium megathyris Dall, Proc. U. S. Nat. Mus., 1889, **12**, p. 293, pl. **9**, fig. 1; Stearns, *op. cit.*, 1893, **16**, p. 424; Pilsbry, Mon. Scaphopoda, Man. Conch., 1897, **17**, p. 67, pl. **15**, figs. 29, 30, 31.

The following table shows the distribution of this species as far as known:

Station.	Locality.	Depth.	Bottom.	Bottom temp. F.	Mus. Reg.
*3360	Gulf of Panama	1672	sand	36°.4	122,982
*3361	" "	1471	ooze	36°.6	122,977
*3381	" "	1772	mud	35°.8	122,975
3399	" "	1740	ooze	36°.0	122,980
3407	off Galapagos Ids.	885	"	37°.2	122,978
3413	" "	1360	"	36°.0	122,979
3431	Gulf of California	995	mud	37°.0	122,976
3432	" "	1421	"	37°.8	122,981
3414	off Tehuantepec	2232	"	38°.5	122,974
2788	off Chiloe Id.	1050		36°.9	110,665
2789	off S. W. Chile	1342		35°.9	87,558
2807	off Galapagos Ids.	812	ooze	38°.4	117,830

As in previous instances the specimens in nearly all cases were badly eroded. A considerable range of variation was observed in the matter of curvature, some being straighter than others taken in the same haul of the dredge, some thinner-shelled, in many individuals the aperture being almost absolutely circular.

The specimens from the stations above, to which is prefixed an asterisk, — in addition to being thinner-shelled, with a slightly more even curvature, circular aperture, with the longitudinal sculpture retaining its sharpness to the end, instead of flattening out as in typical *megathyris*, — have also at the anal end on the dorsal side a notch which varies from 1.0 mm. to 7.0 mm. in length, while in the best preserved typical *megathyris* observed in the young stages, the anal aperture is always entire. For this variety, which seems to grade into the type, the varietal name of *panamense* is proposed, though it may eventually prove to be a distinct species.

Dentalium peruvianum Dall, n. sp.

Shell white, straight, except for a slight curve near the anal end which is at its maximum about 20 mm. in front of the anal end; surface with an extremely thin, yellowish periostracum, finely longitudinally striated, with wider slightly rounded interspaces varying more or less in width; these interspaces rise into thread-like form near the anal end, where they alternate in size, but are never very strong; there are about twenty-six of them just in front of the slit; in advance of this point the intercalaries chiefly begin; the anal end is rounded, about 1.75 mm. in diameter, with a wide slit on the convexly arcuate or dorsal side, the slit at its beginning is 1.7 mm. wide, and has a length of 5.0 mm. The oral aperture is nearly circular, measuring 12.0 mm. wide and 11.25 mm. dorso-ventrally; the margin is very sharp and thin; the type specimen measures 90.0 mm. in length, of which two-thirds is nearly straight, the maximum deviation of the ventral surface from a chord connecting the two extremities is 2.5 mm., about 20.0 mm. in front of the anal end.

U. S. S. "Albatross," station 4656, in 2222 fathoms, mud, off the Peruvian coast in S. Latitude 6° 55′ and W. Longitude 83° 34′; bottom temperature 35°.2 F. U. S. N. Mus. 110,667. Also at station 4649, in S. Latitude 5° 17′ and W. Longitude 85° 20′, in 2235 fathoms, mud, temperature 35°.4, a fragment of the same species.

The type specimen had served as a pedestal for a large deep-water Actinia.

The species is straighter, more slender, and less tapering, and with a much feebler sculpture than *D. panamense*, which is also shorter in proportion to its oral diameter; *D. ceras* Watson, otherwise apparently its nearest relative, is quite distinct, on comparison.

Dentalium agassizii Pilsbry and Sharp.

Plate 4, figure 8.

Dentalium agassizii Pilsbry and Sharp, Man. Conch., 1897, **17**, p. 26, pl. **12**, figs. 90–94.

The following table shows the various stations at which this species has been dredged by the "Albatross" on her various cruises.

Station.	Locality.	Depth.	Bottom.	Bot. temp. F.	Mus. Reg.
2839	Sta. Barbara Islands	414	sand	41°.4	122814
3354	off Panama	322	mud	46°.0	122983
3392	" "	1270	hard	36°.4	122984
3393	" " (Type)	1020	mud	36°.8	122985
3394	" "	511	"	41°.8	122986
3418	off Mexico	660	sand	39°.0	122987
3430	" "	852	"	37°.9	122988
3431	Gulf of California	995	mud	37°.8	122989
2923	off San Diego, Cal.	822	"	39°.0	110672

This is one of the most elegant and abundant species of the region with a geographical range of forty degrees in longitude and nearly 2000 miles in latitude.

Dentalium brevicornu Pilsbry and Sharp.

Dentalium (*Compressidens*) *brevicornu* Pilsbry and Sharp, Man. Conch., 1897, **17**, p. 125, pl. **22**, figs. 53, 54, 55.

U. S. S. "Albatross," station 2807, near the Galapagos Islands, in 812 fathoms, ooze, bottom temperature 38°.4 F.; at station 2808, in 634 fathoms, sand, temperature 40° (U. S. N. Mus. 122,809); and station 3431, off Mazatlan, Mexico, in 995 fathoms, mud, temperature 37°.0.

Very closely allied to the Atlantic *D. pressum* Pilsbry and Sharp, but the tube increases more rapidly in caliber, and is decidedly less compressed on the outer curve, according to Pilsbry, *op. cit.*

Dentalium dalli Pilsbry and Sharp.

Dentalium (*Rhabdus*) *dalli* Pilsbry and Sharp, Man. Conch., 1897, **17**, p. 114, pl. **21**, fig. 46.

U. S. S. "Albatross," station 3354, Gulf of Panama, in 322 fathoms, mud, bottom temperature 46° F. U. S. N. Mus. 122,991. Also at station 3418, off the coast of Mexico, near Acapulco, in 660 fathoms, sand, bottom temperature 39° F.; station 4654, off Aguja Point, Peru, in 1036 fathoms, mud, temperature 38°.5; station 3346, off Tillamook, Oregon, in 786 fathoms, mud, temperature 37°.3; station 3200, in the western entrance to the Santa Barbara channel, California, in 265 fathoms, mud, temperature 43°.1; and northward to Bering Sea, where it occurs north of Unalashka in from 109 to 350 fathoms.

Pilsbry notes that this species differs from specimens of *D. pretiosum*, which sometimes approach it very nearly in size and form, by its extreme thinness and fragility, beside lacking the apical striation of young *D. pretiosum*.

Specimens from off Acapulco reach a length of 66.0 with an oral diameter of 4.5 mm.

CADULUS Philippi.

GADILA Gray.

Gadila Gray, P. Z. S. 1847, p. 159; type *Dentalium gadus* Montagu.
Helonyx Stimpson, Am. Journ. Conch., 1865, **1**, p. 63, *Dentalium clavatum* Gould.

Cadulus (Gadila) striatus Dall.

Plate 5, figure 3.

Cadulus striatus Dall (U. S. Nat. Mus. label), Pilsbry, in Man. Conch., 1897, **17**, p. 179, pl. **35**, figs. 9–13.

U. S. S. "Albatross," station 3354, Gulf of Panama, in 322 fathoms, mud, bottom temperature 46° F. U. S. N. Mus. 122,992. Also at station 3418, off the Mexican coast near Acapulco, in 660 fathoms, sand, bottom temperature 39° F.

Not unlike *C. albicomatus* Dall, but more slender, and with more delicate longitudinal striation.

Cadulus (Gadila) albicomatus Dall.

Plate 19, figure 3.

Cadulus albicomatus Dall, Proc. U. S. Nat. Mus., 1889, **12**, no. 773, p. 295, pl. **9**, fig. 8; Pilsbry, Man. Conch., 1897, **17**, p. 178, pl. **35**, fig. 15.

U. S. S. "Albatross," station 3360, Gulf of Panama, in 1672 fathoms, sand, bottom temperature 42° F. U. S. N. Mus. 122,993. Also off Manta, Ecuador, in West Longitude 81° just south of the Equator, at station 2792, in 401 fathoms, mud, bottom temperature 42°.9.

One of the largest and finest species of the genus.

Cadulus (Gadila) californicus Pilsbry and Sharp.

Cadulus californicus Pilsbry and Sharp, Man. Conch., 1898, **17**, p. 180, pl. **34**, figs. 5, 6, 7, 8.

U. S. S. "Albatross," station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F. U. S. N. Mus. 122,994. Also from the latitude of Tillamook Bay, Oregon, to San Diego, California, in from 218 to 222 fathoms, temperatures ranging from 37.°3 to 43°.2.

A large, stout species which varies somewhat in its degree of inflation. When complete, the anal aperture has two strong lateral sulci and a slight curved excavation in the medial line of the concave side between them.

Cadulus (Gadila) platystoma Pilsbry and Sharp.

Cadulus platystoma Pilsbry and Sharp, Man. Conch., 1898, **17**, p. 180, pl. **35**, figs. 17, 18.

U. S. S. "Albatross," station 2792, off Manta, Ecuador, in 401 fathoms, mud, bottom temperature 42°.9 F. U. S. N. Mus. 107,699.

Somewhat like *C. poculum*, of the Atlantic, in being markedly bent, with the tube compressed anteriorly, but in the Pacific species the inflation is greater and not angulate, and the posterior part of the shell less attenuated. *C. peruvianus* is stouter, with a proportionately larger oral aperture.

Cadulus (Gadila) peruvianus Dall, n. sp.

Shell milk-white, smooth, polished, arcuate, inflated; aperture oblique, the form oval, with the dorsoventral diameter shorter; equator nearly at the anterior third, the anterior part contracting markedly from the equator forward but without angularity; posterior portion not greatly attenuated, rather unusually large for the genus, the anal aperture apparently circular and simple. Length, 12.3; anal end to equator, 8.3; perpendicular between shell and chord, 1.0; max. diam., 3.0; of oral aperture, 2.0; vertical of do., 1.6; anal aperture, 1.0 mm.

U. S. S. "Albatross," station 4654, off Point Aguja, Peru, in 1036 fathoms, mud, bottom temperature 38°.5 F. U. S. N. Mus. 110,671. Also at station 2807, near the Galapagos Islands, in 812 fathoms, ooze, temperature 38°.4.

The oral aperture is notably oblique, being inclined at an angle of some 40°.

The shortness and stout form of this species sufficiently differentiate it from others of the region.

PELECYPODA.

PRIONODESMACEA.

(A. *Margo edentato.*)

Solenomyacea.

Solenomyacidae.

SOLEMYA Lamarck.

Solemya Lamarck, An. s. Vert., 1818, **5**, p. 488. 1st sp., *S. australis* Lam., l.c. selected as type by Bowdich, 1822, and Blainville, 1825.

This genus was first brought to notice in 1793, by Ulysses von Salis Marschlins in the second edition of his Neapel Reise, where he named a specimen from

Tarentum *Mytilus solen*, and gave a tolerable figure. Two years later in the second volume of Poli's *Testacea utriusque Siciliae* the author named the shell *Tellina togata* and figured it. In the same year it reappeared in the English translation of Ulysses' Travels. The Mediterranean species, which must take the name of *Solemya solen* (Ulysses), was named *S. mediterranea* by Lamarck in 1818, and was the subject of a remarkable anatomical study by Deshayes in his Mollusques de l'Algerie. In this work the shell is admirably figured, and an excellent photographic figure of the interior appears in the plates to the Mollusques marins du Roussillon.

In this connection it may be stated that no complete account of the hinge of this genus is, so far as I have been able to discover, anywhere to be found in print. Also that the hinge is by no means uniform in all the species, but by means of it they can be divided into groups.

Solemya australis has a very archaic type of ligament, as perhaps might be expected from the archaic features of the anatomy and the *situs* which the genus usually frequent. Yet it is true that the paleozoic relatives of this group have an external ligament. In the present species in a fresh state the periostracum and true ligament are continuous over the hinge and the gap between the two valves, as was the original protoconch in the embryo. The only distinction perceptible is that the ligament is a little darker in color. The hinge line is entirely free from any trace of provinculum or teeth. The functional part of the ligament is amphidetic, extending on both sides of the beaks and included in a deep groove between two shelly laminae forming the dorsal calcification of the valve, the ligament extending beyond the enclosing laminae both before and behind. If dry and broken, the section of the ligament has a glassy look, like a piece of glue. Under the middle of the ligament and between it and the inner lamina of attachment (or nymph) is the resilium, much thicker than the ligament, and of a more fibrous constitution and darker color. The resilium also extends backward of the beaks, but not so far as the ligament with which it is intimately cemented. The ligament extends in advance of the nymph and beaks, throwing down on the inner surface of the valve an oval, brown lobe like a dab of varnish. In *S. parkinsoni* Gray, this lobe is straight, elongated, and narrow.

The inner lamina or nymph is heavily reinforced with shelly matter, so as to bear the strains incident to the resilium which is seated upon it. As the two valves are not so closely adjacent as in most modern bivalves, the resilium is visible where it crosses the gap between the two valves to join the opposite nymph, and in an unbroken specimen an internal view of the hinge shows in brown, against the whiter shelly matter, an X-shaped mass composed of the soldered ligament and resilium, the anterior arms of the X being formed by the two ligamental lobes above described. The nymph on each side may be sustained by a prop or rib of shelly matter at each end, and between these ridges may be situated the posterior adductor, but in *S. australis* only the anterior ridge is developed, extended about half-way across the valve, much like the rib in Siliqua. The posterior muscular impression is directly behind this rib. In

S. solen (*mediterranea* Lamarck + *togata* Poli) the chondrophore has no anterior or posterior rib, and the anterior exposure of the internal part of the ligament is reduced to a narrow line directed obliquely backward to the upper anterior angle of the posterior adductor scar.

In *S. velum* Say, the most common species of New England, we find the ligament has become wholly opisthodetic, no part of it appears in advance of the beaks, and there is no exposure in front of the nymphs (or chondrophores) of the ligament on the interior surface of the shell. The chondrophore in each valve has an anterior and a posterior prop, neither being produced into a rib, and the posterior adductor scar is only partly included in the space between the two props, the posterior prop touching the middle of the dorsal edge of the scar. In *S. borealis* Totten, the same arrangement prevails, but the props are so strong and the nymph so projecting that a small cave under the nymph is created. On the anterior edge of the nymph is a small, narrow, elongate, muscular scar which may belong to one of the pedal retractors. *S. panamensis* Dall agrees with *S. velum*, except that the anterior prop is produced along the anterior edge of the adductor scar, as a feeble ridge.

In *S. agassizii* Dall there are no supports to the chondrophore and no interior exposure of the ligament, which is opisthodetic and wholly external. As far as can be judged from the material at hand, there seems to have been a series of muscular attachments for a considerable distance along the dorsal margin of the valves in front of the supposed pedal protractor scar above referred to. At least there are strong radial striations resembling the scar of adhesion of a muscle. *S. patagonica* E. A. Smith (Challenger Report, 1885) has a hinge apparently similar to that of *S. agassizii*, but in the unique specimen a thickening along the dorsal side, which I strongly suspect to be pathological. If this suspicion proves correct, it is probable that *S. macrodactyla*, which is of four years later date, will prove to be synonymous.

The groups into which the species fall, according to their characters, are as follows:

I. Ligament amphidetic, chiefly internal.

1. Subgenus SOLEMYA s. s. Ligament exposed internally, in advance of the chondrophore.
    - A. Proximal part of the chondrophore prolonged as a thickened ridge part way across the interior of the valve . . . . *S. australis* Lam.
    - B. Base of the chondrophore divided, anterior part extended as a narrow ridge; posterior part forming a thickened prop to the chondrophore. *S. parkinsonii* Gray.
    - C. Chondrophore thickened, without props or extended rib. *S. solen* v. Salis.

II. Ligament opisthodetic, internal.

2. Subgenus PETRASMA Dall. Ligament not exposed internally in front of the chondrophore.

A. Chondrophore supported by two strong props with a cavity between them . . . . a. *S. borealis* Totten.
b. *S. velum* Say.

B. Chondrophore with an anterior prop, extended as a small rib in front of the adductor scar, no posterior prop . . a. *S. panamensis* Dall.
b. *S. occidentalis* Deshayes.
c. *S. pusilla* Gould.

C. Chondrophore without props . . . . *S. valvulus* Carpenter.

III. Ligament opisthodetic, wholly external.

3. Subgenus ACHARAX Dall. Ligament visible internally only where it crosses the gap between the margins of the valves. Nymphs without props.
a. *S. macrodactyla* Rochbrune et Mabille.
(?) = *S. patagonica* Smith.
b. *S. johnsoni* Dall.
c. *S. agassizii* Dall.
d. *S. ventricosa* Conr.
e. *S. grandis* Verrill and Bush.

S. japonica Dunker is the adult of the shell named *S. pusilla* Gould. *S. mediterranea* Lamarck is a synonym of *S. solen,* as is *S. togata* "Poli."

The geographical distribution of the forms above referred to is as follows:

I.
S. australis Lamarck, South Australia and New Zealand.
S. parkinsonii Gray, New Zealand.
S. solen von Salis, Mediterranean and Adriatic; southeastern coast of Spain; Madeira, and Senegal.

II.
S. borealis Totten, Halifax, Nova Scotia, to Pensacola, Florida.
S. velum Say, Halifax, Nova Scotia, to North Carolina.
S. occidentalis Deshayes, Spezzia, Tripoli, Morocco, Florida Keys, Old Providence Island, West Indies, and the Yucatan Passage, 2–200 fathoms.
S. panamensis Dall, Santa Barbara, California, south to Panama Bay, 30–60 fathoms.
S. pusilla Gould, Hakodate, Japan, 5 fathoms.
S. valvulus Carpenter, San Pedro, California, and south to the Gulf of California.

S. protexta Conrad, from the Miocene of Astoria, if not the young of *S. ventricosa* Conrad, may belong to this subgenus. *Modiola linea* Hedley, from the Tasman Sea, is suspiciously like a young Acharax.

III.
S. agassizii Dall, from Tillamook Bay, Oregon, to Aguja Point, Peru, 1036–1800 fathoms.
S. macrodactyla R. & M., Orange Harbor, Patagonia, northward to Chiloë Island, Southwest Chile, 20–369 fathoms.
S. johnsoni Dall, Puget Sound to Panama Bay, 60–1740 fathoms.
S. ventricosa Conrad, fossil, Miocene of Astoria, Oregon.
S. grandis Verrill and Bush, off the eastern coast of the United States, between Chesapeake Bay and Nantucket, in 300 to 1600 fathoms.
S. patagonica E. A. Smith, west coast of Patagonia.

Solemya (Acharax) agassizii DALL. n. sp.

Plate 16, figure 10.

Shell large, elongated, heavy, chalky, with a strong blackish periostracum which, except near the middle of the base, is produced into long ragged processes beyond the margin of the valve; the surface of the valve is radially channelled with wide, deep channels which are reflected by prominent ribs on the inner surface of the valves; it is the portion of the periostracum which lies in the channels which forms the processes, and that which covers the interspaces which fails to retain its continuity except for a short distance beyond the edge of the valve; valves very inequilateral, posterior end very short, hinge line nearly straight, the sulcus for the ligament nearly parallel with the hinge line, and the nymph inconspicuous so that on a casual glance one might suppose there was none; beaks not raised, the hinge line below them thickened and flat, radially striated; anterior hinge line straight, thin; valves widest at the anterior margin; anterior part of the valve with six or seven strong radial channels, the interspaces wider, and often with their margins a little raised or with a slightly elevated border; beyond the channelled area there are a few faint radial furrows and a perfectly smooth unfurrowed space in the middle of the valve; posterior slope straight, furrow for the ligament long, deep, and wholly external; there is a wide triangular smooth space, in front of which are five or six channels radiating to the margin, much more shallow than those at the anterior end and defined chiefly by shallow furrows at each side of the obsolete channel and the raised margins of the wide interspaces; interior chalky, the anterior muscular impression feeble, the posterior stronger and ovate. Length of the valve, excluding periostracum, about 95; height, 30; and diameter, 25 mm. The species reaches a length of more than 150 mm.

U. S. S. "Albatross," station 3360, Gulf of Panama, in 1672 fathoms, sand, bottom temperature 36°.4 F. U. S. N. Mus. 106,885. Also at station 3381, in 1772 fathoms; 3382, in 1793 fathoms; 3399, in 1740 fathoms; 3434, in 1588 fathoms; and 4654, off Aguja Point, Peru, in 1036 fathoms, all on soft bottom with temperatures varying from 35°.8 to 37°.3. The range of the species, so far as known, extends from the Gulf of California south to the vicinity of Aguja Point, Peru.

Owing to the burrowing habit of the genus, only fragments and dead valves were obtained in the trawl.

This species belongs to the group of *S. macrodactyla* Rochebrune and Mabille, from Orange Harbor, Patagonia, but differs from it in the smooth middle area of the valves, proportionately shorter posterior end, and much larger size. It is the largest species I have seen in which the ligament is wholly external, or in which the shell is so solid as to survive the loss of the tough protective periostracum. *S. grandis* is a shorter and wider species. The young of *S. agassizii* are more cylindrical than the specimens of *S. macrodactyla* of equal size.

When first collected this species was confounded with the *Solemya johnsoni* Dall, a northern species described from a specimen collected off the coast of Oregon, and which also extends to the Gulf of Panama, but that species, instead of having six or seven anterior radial channels like *S. agassizii*, has from nine to twelve; the projections of the periostracum are much longer on the anterior part of the shell than posteriorly, giving a subtriangular profile (as figured in Proc. U. S. Nat. Mus., **17**, plate **25**, fig. 1894).

It is difficult to be dogmatically confident as to specific limits in forms like these when one has only more or less imperfect valves without the soft parts, and especially modifiable by the results of drying. If in future these three species ever become known through abundant material and prove to be merely variations of a single type, it will show a marvellous distribution from Puget Sound, south to the Straits of Magellan. But I have not seen any unmistakable specimens of *S. macrodactyla* from north of the Island of Chiloë, on the Pacific side.

Solemya (Petrasma) panamensis Dall, n. sp.

Shell thin, elongate-oval, the posterior end more pointedly, and the anterior end more bluntly, rounded; periostracum brown, brilliantly polished, recurved over the margins of the valves, not produced into long processes, though more or less broken up outside of the margins; anterior part of the shell radiately marked with eight or nine obscure rays, which are more crowded in front and dorsally; the middle of the valve with a few sparse rays, the posterior part having six or seven more closely adjacent, followed by a smooth unradiated area behind the beaks and above a line drawn from them to the middle of the posterior end of the valve; beaks flat, with a lozenge-shaped area of ligament visible behind them; interior bluish, translucent; the chondrophore strong, projecting obliquely into the cavity, its front margin prolonged as a narrow, elevated rib very obliquely backward in front of the posterior adductor scar; muscular impressions rather obscure; interior of the valves faintly radiately striated. Lon. of valve exclusive of the periostracum, 39.0; alt. 15.0; diameter, 8.0 +; the beaks in front of the posterior end, 14.0 mm.

U. S. S. "Albatross," station 2799, Panama Bay, in 29½ fathoms, mud. U. S. N. Mus. 110,678. Also at 2973, off Santa Barbara, California, in 68 fathoms, mud, bottom temperature 54° F.

This is more expanded in front and less sharply truncate in front than *S. agassizii* of the same length, and they may be separated at once by the difference in the hinges. *S. valvulus* Carpenter is a much smaller species and has no anterior prop to the chondrophore.

An examination of specimens of Pthonia, Clinopistha, Dystactella, and Solemya, from the Palaeozoic beds of the west, shows that all the groups except the last have the valves completely closed, the periostracum not extended beyond the valve margins, and the ligament external. *Solemya radiata* Meek and Worthen, a fine species from the Carboniferous of Illinois, has the ligament external and the hinge apparently very similar to that of *S. agassizii*. The other characters, however, would hardly allow it to be united in the same subgenus.

(B. TAXODONTA).

Nuculacea.

Nuculidae.

Nucula LAMARCK.

Nucula Lamarck, Prodrome, 1799, p. 87 ; Syst. des an. s. Vert., 1801, p. 115 ; type, *Arca nucleus* Linné; Dall, Trans. Wagner Inst., 1898, **3**, p. 571.
Glycymeris Da Costa, Brit. Conch., 1778, p. 170, *ex parte.*
Nuculana Link, Beschr. Rostock Samml., 1807, p. 155. (New name for *Nucula* Lamarck).

Nucula tanneri DALL, n. sp.

Shell oval, inequilateral, with low opisthocoelous beaks, brownish periostracum with concentric zones of darker and lighter shade; sculpture of faint concentric ripples giving a rude aspect to the shell; interior pearly, the margins smooth and entire ; the chondrophore small, obliquely anteriorly directed ; anterior teeth, 14–17, posterior, 7–9 ; no defined lunule or escutcheon, a faintly impressed lanceolate area behind the beaks. Length, 22.5 ; of anterior part before the vertical of the beaks, 17.0 ; alt. 16.5 ; diameter, 10.0 mm.

Straits of Magellan at station 2780, in 369 fathoms, mud, bottom temperature 47° F. U. S. N. Mus. 96,243 ; stations 2781, 2783, 2784, and 2787, on the west coast of Patagonia, in 61 to 348 fathoms, mud, temperature 48° to 54°.

This species, named in honor of the late commander of the "Albatross," differs from *N. savatieri* in its less smooth surfaces, browner color, fewer hinge teeth ; and slightly less ovate form, and, in proportion to its size, it is more turgid.

In this and the other diagnoses, the anatomically anterior, usually longer end is designated as anterior, and the truncated end as posterior.

Nucula savatieri MABILLE AND ROCHEBRUNE.

Plate 18, figure 11.

Nucula savatieri Mabille et Rochebrune, Miss. du Cap Horn, Moll., 1889, p. H 112, pl. **8**, figs. 2a–c.

Shell pale olive, brilliantly polished, compressed subovate, very inequilateral, with no defined lunule or escutcheon ; posterior end short, attenuated, roundly pointed but hardly rostrate ; anterior slope convexly arcuate, longer, rounded in front, the base evenly arcuate ; beaks low, slightly opisthocoelous ; hinge with twenty-four anterior and about ten posterior teeth ; interior of the disk pearly, smooth, with smooth entire margins ; chondrophore narrow, anteriorly obliquely directed, with a strong black resilium. Alt. 10–15; lon. of shell, 14–21; beaks in front of the posterior end, 4–5.5; diam. 5–8 mm.

U. S. S. "Albatross," station 3354, Gulf of Panama, in 322 fathoms, mud, bottom temperature 46° F. U. S. N. Mus. 122,893; station 4654, 24 miles off Aguja Point, Peru, in 1036 fathoms, mud, temperature 37°.3; station 2783, on the west coast of Patagonia, in 122 fathoms, mud, temperature 48°; station 2779, in the Straits of Magellan, in 77 fathoms, ooze, temperature 47°. Orange Harbor, Beagle Channel, Rochebrune.

This differs from *N. tanneri* as mentioned under that species; the most conspicuous character is the smooth, polished, and uniformly colored surface of the *savatieri* as compared with the concentric color zones and sculpture of *tanneri*.

The specimen figured is not fully mature, but except in size hardly differs from the larger adults. Their respective measurements follow the diagnosis above.

Nucula panamina Dall, n. sp.

Plate 6, figure 11.

Shell large, thick, solid, with a dark, polished olivaceous periostracum, smooth surface, and rather donaciform outline; lines of growth irregular in strength; beaks low, small, opisthocoelous, very posterior; no lunule or escutcheon; posterior dorsal slope short, direct, flattish; posterior end narrow, rounded; anterior slope long, evenly arcuate, anterior end rounded, the base gently arcuate; interior of disk pearly, more or less radiately striate, but the valve-margins smooth and entire; muscular scars deep, subequal; posterior hinge line with ten, anterior with about twenty, long slightly folded sharp teeth; chondrophore small, narrow, anteriorly directed; alt. 16; lon. 22; diam. 9 mm.

U. S. S. "Albatross," station 3360, Gulf of Panama, in 1672 fathoms, sand, bottom temperature 42° F. U. S. N. Mus. 122,894.

In general form this species exhibits a tendency toward that of the next species, but somewhat less divergent from the ordinary type of Nucula.

Nucula taeniolata Dall, n. sp.

Plate 7, figures 3, 5.

Shell elongate, almost rostrate, thin, polished, dark olive color, paler on the umbones, subtruncate behind, produced and rounded in front, somewhat compressed; beaks small, pointed, slightly opisthogyrate, nearer the posterior end; lunule and escutcheon not defined, an obscurely defined depressed lanceolate area on the shorter side of the beaks with the dorsal margins compressed, descending, arcuate, terminating at a blunt subtruncate extremity beneath which the basal margin is slightly concavely arcuate; the anterior dorsal slope higher, longer, arcuate, descending to an evenly rounded extremity, the curve passing insensibly into the convex arcuation of the basal margin; surface polished on the umbones, on the disk and periphery more or less minutely, irregularly wrinkled, especially near the truncation and the basal margin; there are also a few very faint, almost microscopic, irregularly distributed radial striae; interior of the valves slightly pearly, the muscular and pallial scars faint, the latter entire; margin of the valves simple, smooth; hinge with six cardinal teeth on the shorter and ten on the longer side; chondrophore small, narrow, directed obliquely forward; lon. of valve, 17; of the beaks before the truncation, 7; alt. 11; diam. 6.5 mm.

U. S. S. "Albatross," station 3417, off Acapulco, Mexico, in 493 fathoms, mud, bottom temperature 40°.6 F. U. S. N. Mus. 122,897.

There is more or less difference between individuals in regard to rostration, some having it more emphatic than others. In form this species somewhat approaches Leda, but there is not the slightest pallial sinuation.

Nucula iphigenia Dall.

Plate 7, figures, 1, 4.

Nucula iphigenia Dall, Proc. U. S. Nat. Mus., 1895, **18**, p. 15.

Shell large, solid, much like *Iphigenia brasiliana* in outline, anterior end produced, rounded, longer than the posterior; hinder end obliquely truncate, attenuated; beaks elevated, somewhat pointed, opisthogyrous; sculpture of feeble, narrow, irregular concentric wrinkles, crossed by fine, sharp, rather distant incised lines; lunule narrow, elongate, bordered by a faint ridge; escutcheon small, broader than long, set off by an impressed line from the large posterior area, which is flattened but not definitely limited, the margin of the valve projecting somewhat in the middle line; base rounded in front, somewhat impressed posteriorly; interior brilliantly nacreous, with a strong pallial line and subequal adductor scars; the pallial area more or less punctate; basal margin denticulate; hinge with about thirty anterior and fifteen posterior teeth, strong, projecting, and somewhat angular; chondrophore narrow, pear-shaped, projecting forward from the hinge line. Height of shell, 22.5; length, 35; diameter, 16 mm.

U. S. S. "Albatross," station 3396, Gulf of Panama, in 259 fathoms, hard bottom; temperature, 47°.4 F. U. S. N. Mus. 122,895.

This fine shell is one of the largest known nuculas, and peculiar from its elongated shape and posterior attenuation. The periostracum seems to have been thin, dull, and yellowish.

Nucula pigafettae Dall, n. sp.

Shell small, blackish-brown or dark olivaceous, rude, inequilateral, concentrically irregularly striated, the striae more or less distributed in zones, very minutely, feebly, more or less radially striated, but not visibly reticulate; beaks rather posterior, turgid, moderately prominent; a heart-shaped escutcheon 5 mm. long below the opisthogyrate beaks; no lunule; dorsal slopes and base arcuate, ends rounded; interior pearly with entire margins; hinge with 15–17 anterior, and 7 posterior teeth, the chondrophore narrow, small, obliquely anteriorly directed. Length of shell, 15; of posterior end, 5; alt. 10.5; max. diam. 7.5 mm.

U. S. "Albatross," station 2780, Magellan Straits, in 369 fathoms, mud, bottom temperature 47° F. U. S. N. Mus. 96,243.

Named in honor of Magellan's historiographer. A particularly rude and turgid species; all of the specimens were thickly encrusted with a ferruginous coating.

Nucula agujana Dall, n. sp.

Plate 10, figures 6, 7.

Shell small, inequilateral, plump, polished, nearly black with paler olivaceous umbones, subtriangular in outline; umbones high, full, opisthocoelous; posterior dorsal slope flattened, but with no areal limitation, short; anterior slope longer, arcuate, without a defined lunule; anterior end rounded, posterior subangular; basal margin evenly arcuate: surface smooth at the umbones, over the rest of the disk with irregular, rather course concentric incremental lines; interior pearly, with deep muscular impressions, and smooth valve margins; hinge with nine posterior and fifteen anterior teeth, separated by a narrow, oblique chondrophore. Lon. of shell, 11, of beaks before the posterior end, 3; alt. 8; diam. 5.75 mm.

U. S. S. " Albatross," station 4654, twenty-four miles N. 68° W. from Aguja Point, Peru, in 1036 fathoms, mud, bottom temperature 37°.3 F. U. S. N. Mus. 110,571.

Nucula exigua Sowerby.

Nucula exigua Sowerby, P. Z. S. London, 1832, p. 198; Conch. Ill., figs. 24, 24* (bad); Hanley, Thes. Conch. Nuculidae, p. 50, fig. 136 (*meliora*).

Bay of Panama, Cuming; U. S. S. "Albatross," station 3418, off Acapulco, Mexico, in 660 fathoms, sand, temperature 39°; station 2807, near the Galapagos Islands, in 812 fathoms, ooze, temperature 38°.4, station 4654, off Aguja Point, Peru, in 1036 fathoms, mud, temperature 37°.3; stations 2783, and 2784, on the west coast of Patagonia, in 122 and 194 fathoms, mud, temperatures 48° and 51°.9 F.

Hanley's figure, of all I have seen, is the only tolerably good one. All the extant figures are made from immature specimens; the fully adult specimens are less oblong, more triangular, and more inflated. *Nucula pisum* Sowerby and *N. semiornata* Orbigny are perhaps synonymous.

Nucula chrysocoma Dall, n. sp.

Plate 18, figures 3, 4.

Shell small, plump, solid, subtriangular, brilliantly polished and of a light yellowish olive color; beaks moderately prominent, the prodissoconch showing conspicuously as two whitish disks on the umbones, smooth and easily eroded; beaks subcentral, touching, not recurved; lunule and escutcheon large for the size of the shell, with no radial markings and faintly delimited but not distinctly impressed; ligament not visible externally; posterior dorsal slope straight, posterior end shorter and somewhat pointed; anterior slope slightly convexly arcuate, anterior end rounded; base very convexly arcuate; concentric sculpture only of a few irregularly distributed impressed lines indicating resting stages; radial sculpture of numerous very fine, slightly raised, close-set lines, with equal and regularly spaced interspaces, covering the disk; interior pearly, smooth, with entire valve margins, muscular scars distinct; hinge line with six posterior and ten anterior teeth, the two series separated by a deep pit containing the nearly vertical chondrophore. Lon. 5.0; alt. 4.5; diam. 3.0 mm.

U. S. S. "Albatross," station 4656, off the coast of Peru in S. Lat. 6°55′ and W. Lon. 83° 34′, in 2222 fathoms, green mud, bottom temperature 35°2 F. U. S. N. Mus. 110,572; station 2792, off Manta, Ecuador, in 401 fathoms, mud, temperature 42°.9; and station 3418, off Acapulco, Mexico, in 660 fathoms, sand, temperature 39°.

This is an exceedingly elegant little shell with a wide range in latitude and depth.

Nucula declivis Hinds.

Nucula declivis Hinds, P. Z. S. London, 1843, p. 97; Zool. Voy. Sulph., 1844, Moll., p. 63, pl. **18**, fig. 8.

U. S. S. "Albatross," station 2805, Panama Bay, in 51 fathoms, mud. Also at station 2778, in Magellan Straits, in 61 fathoms, sand, bottom temperature 47°.9 F. U. S. N. Mus. 110,685.

The locality of this species is not given by Hinds, but his excellent figure and brief description agree well with the shell above referred to, and as his collections were largely made on the Pacific coast of south and middle America it is probable that the identification is correct.

Nucula colombiana Dall, n. sp.

Shell small, very inequilateral, ovate, white with an olivaceous pale periostracum, smooth, brilliantly polished, anterior dorsal margin and base convexly arcuate; posterior dorsal margin short, straight, subtruncate, with the valve-margins pouting a little in the middle of the flattened posterior area; posterior end attenuated, short, almost pointed; anterior end evenly rounded; beaks turgid, opisthogyrate; interior pearly, with smooth margins to the valves; posterior hinge line with seven, anterior with fourteen teeth, separated by a well-developed chondrophore. Length of whole shell, 4.5; of posterior segment, 1.0; alt. 3.0; max. diam. 2.2 mm.

West coast of Colombia, in Panama Bay at station 2799, in 29½ fathoms; U. S. N. Mus. 110,686. Also at station 2805, Panama Bay in 51 fathoms; station 2792, off Manta, Ecuador, in 401 fathoms, mud, bottom temperature 42°.9 F.; stations 2784, southern coast of Chile, in 194 fathoms, mud, temperature 51°.9, and 2783, in 122 fathoms, temperature 48°; and on the west coast of Patagonia, South latitude 51°12′, in 258 fathoms, mud, temperature 48°. An abundant, small and simple species unlike any other of the region, with a range of some 3600 miles in latitude.

Ledidae.

LEDINAE.

LEDA SCHUMACHER.

In reviewing the synonymy of this genus I find a correction necessary to the statement which appears in Trans. Wagner Institute, 3, p. 579. It is stated there that the type of the genus is *Leda rostrata* Montagu. The early writers confused various species of Leda together and the *rostrata* of Montagu was not the species figured by Chemnitz (VII, figs. 550, 551) and Schumacher, and which was named *Mya pernula* by Müller in 1779. Of this species *rostrata* is a synonym. The species described and figured by Montagu as *Arca rostrata* and accepted as *Leda rostrata* by Hanley (Mon. Nuculacea) is a Lembulus. The type of Leda should therefore be cited as *Leda pernula* Müller (+ *L. rostrata* Gmelin and Schumacher but not of Montagu and Hanley).

Leda (Jupiteria) gibbosa SOWERBY.

Nucula gibbosa Sowerby, P. Z. S. Lond. 1832, p. 198; Conch. Icon., 1871, **18**, Mon. *Laeda*, pl. **8**, fig. 51.

Leda gibbosa Orbigny, Voy. Am. Mér., 1846, Moll., p. 545.

U. S. S. "Albatross," stations 2799, 2803, and 2804, in Panama Bay, in 26 to 47 fathoms, mud. U. S. N. Mus. 96,307. Payta, Peru, Orbigny.

This fine, large, but rather coarse, species attains a length of 35 and a maximum diameter of 14 mm. It has a well-marked pallial sinus rounded behind. Even when living the greater part of the periostracum is usually wanting.

Leda (Jupiteria) callimene DALL, n. sp.

Plate 17, figures 3, 4.

Shell small, solid, plump, white, with a thin, pale brownish periostracum, equivalve, inequilateral; beaks small, pointed adjacent, vertically incurved; lunule and escutcheon not present, though by the presence of a strong radial keel and the flattening of the straight dorsal slope the appearance of a large escutcheon is produced; anterior slope arcuate, passing insensibly into the curve of the rounded anterior end; from the beaks a narrow depressed ray extends to the anterior end of the base, slightly arcuating the sculpture which passes over it, and the basal margin where it intersects: sculpture of concentric, numerous rounded small ridges separated by subequal grooves; this sculpture covers the whole exterior pretty evenly, except a narrow space near the two radial keels, where it is obsolete; interior chalky white, muscular scars small, distinct; pallial sinus small, shallow, pointed behind; margins entire; resiliary pit deep, directly under the beaks, separating twenty-six anterior and about twenty posterior crowded angular hinge-teeth. Lon. of shell, 15.5; of beaks behind the anterior end, 7.0; alt. 10.5; diam. 7.0 mm.

U. S. S. "Albatross," station 3396, Gulf of Panama, in 259 fathoms, mud, bottom temperature 47°.4 F. U. S. N. Mus. 122,910. Also at Tome, Chile, in 14 fathoms.

This species resembles *L. dissimilis* Sowerby, but has the beaks more anterior and a somewhat differently sculptured rostrum. *L. caelata* (Hinds, non Conrad, = *L. taphria* Dall) is more swollen, shorter, and more polished.

Leda (Jupiteria) agapea Dall, n. sp.

Plate 6, figures 4, 5.

Shell large, thin, fragile, pale straw color, inequilateral, finely evenly, concentrically wrinkled; the wrinkles rounded, with subequal interspaces; beaks small, pointed, incurved, closely adjacent, over a chiefly internal, black, amphidetic ligament; lunule smooth, extremely narrow, lanceolate, depressed; escutcheon not defined, posterior dorsal area extending from the beaks to the end of the rostrum, lanceolate, nearly as wide as the shell, bounded by a rounded ridge on each side, which begins as a strong rounded fold near the beaks but gradually weakens; area inside of it depressed, sculptured like the rest of the shell, enclosing a second similar, but much smaller, lanceolate depression beginning close to the beaks and bounded by an indistinctly defined slight elevation of the floor of the main depression; outside the latter is a feebly depressed ray extending from the beaks to a slight insinuation of the basal margin, above and behind which the posterior end of the shell ends in a point or rostrum; anterior end of the shell evenly rounded, base evenly arcuate; interior opaque white, the margin entire, the hinge with about sixteen teeth on each side of a strong, triangular, black, backwardly inclined resilium. Lon. of shell, 21; of beaks behind anterior end, 9; alt. 12; diam. 8 mm.

U. S. S. "Albatross," station 3360, Gulf of Panama, in 1672 fathoms, sand, bottom temperature 42° F. U. S. N. Mus. 122,911. Also at station 3398, in 1573 fathoms, green ooze, bottom temperature 36° F., off the coast of Ecuador.

This species is most nearly related to *L. pontonia* Dall, but has the beaks more anterior and the sculpture coarser and more deeply incised.

The ligament reaches only the distal part of the chondrophore, which is occupied by the resilium.

Leda (Jupiteria) pontonia Dall.

Leda pontonia Dall, Proc. U. S. Nat. Mus., 1889, **12**, p. 257, pl. **13**, figs. 5, 5*b*.

List of Stations.

Station.	Locality.	Fathoms.	Bottom.	Temperature.
2808	Off Galapagos Ids.	634	coral sand	39°.9 F. (types).
3360	Gulf of Panama.	1672	sand	36°.4
3393	" " "	1020	green mud	36°.8
2923	Off San Diego, Cal.	822	" "	39°0.2

Leda (Jupiteria) excavata Hinds.

Nucula excavata Hinds, P. Z. S. London, 1843, p. 100; Zool. Voy. Sulphur, 1844, Moll., p. 64, pl. **18**, fig. 17.

Panama, in 30 fathoms, mud; Hinds. U. S. S. "Albatross," station 2794, in 62 fathoms, sand, bottom temperature 59°.5 F. U. S. N. Mus. 122,763.

By the emphasis on the posterior carinae visible in this species it begins to approach Lembulus.

Leda (Jupiteria) elenensis Sowerby.

Nucula elenensis Sowerby, P. Z. S. London, 1832, p. 198; Hanley, Thes. Conch., **3**, Mon. Nuculacea, p. 121, pl. **228**, fig. 71.

U. S. S. "Albatross," station 2805, in 52 fathoms, mud, Panama Bay.

This species approaches *L. acuta* Conrad, but is less attenuated. According to Hanley the surface sculpture is subject to much variation.

Leda (Jupiteria) acrita Dall, n. sp.

Shell small, white or translucent, with a very pale straw-colored periostracum, subequilateral, swollen, acutely rostrate behind; beaks prominent, adjacent; anterior dorsal margin gently arcuate; posterior slope straight, the opposed margins of the valves slightly pouting in the middle of a longitudinally striate, depressed escutcheon, bounded by two well-marked but not acute radial ridges; these terminate at the slightly gaping posterior end; a shallow radial sulcus, sometimes accompanied by a faint ray, extends from the beaks to the anterior basal margin, with variable strength; middle of the valves prominent, with a variably strong series of short ripples from the beaks to the margin, these ripples absent or obsolete toward the ends of the shell; near the base are five close concentric striae which extend the length of the margin, decidedly finer than the ripples; interior polished, margins entire, pallial sinus distinct; hinge with about fifteen anterior and thirteen posterior teeth, separated by an inconspicuous chondrophore. Length of shell, 6.2.; of anterior end, 3.0; alt. 3.8; max. diam. 3.0 mm.

U. S. S. "Albatross," station 2799, Panama Bay, in 29½ fathoms, mud. U. S. N. Mus. 110,690. Also at stations 2794, in 62 fathoms, sand, bottom temperature 59°.5 F.; 2801, in 14, and 2803 in 26 fathoms, mud.

The sculpture varies in strength a good deal for so small a shell; occasionally the concentric sculpture covers the whole of the valve, and now and then one is seen which seems almost wholly smooth.

Leda (Jupiteria) lobula Dall, n. sp.

Shell small, olivaceous, slightly inequilateral, rounded at both ends, the anterior a little shorter; anterior dorsal slope slightly convexly arcuate, posterior straight; the beaks, capped with a distinct protoconch, low and nearly vertical; both ends rounded, the anterior broader; external sculpture of regular rounded, elevated concentric threads with wider intervals, evenly covering the whole disk but stronger in the middle of the shell; interior polished, hinge with nine teeth on the posterior side of the beaks, and about thirteen on the anterior, the chondrophoric pit confined to the hinge line and very inconspicuous. Length, 4.7; alt. 3.2; diam. 1.5 mm.

U. S. S. "Albatross" station, 3422, in 141 fathoms, mud, off Acapulco, Mexico, bottom temperature 53°.5.

This shell may not be fully mature, but as far as now appears it is not the young of any of the known species of this region. It is remarkable for its oval shape, which if characteristic of the fully adult would hardly allow it to be regarded as a member of this section of the genus.

Leda (Leda) costellata Sowerby.

Nucula costellata Sowerby, P. Z. S. London, 1832, p. 198; Conch. Ill., Nucula, fig. 8; Hanley, Thes. Conch., **3**, Mon. Nuculacea, p. 111, pl. **228**, fig. 59.

Gulf of California to Panama. U. S. S. "Albatross," station 2823, in 26 fathoms, sand. U. S. N. Mus. 96,424.

This species, with *L. decora* and *concinna* A. Adams, has a very different aspect from those of the *L. pernula* type with which they are associated.

Leda (Leda) cordyla Dall, n. sp.

Plate 6, figures 6, 7.

Shell very small, very inequilateral, rostrate, olive green, strongly concentrically sculptured; beaks high, pointed, slightly opisthogyrate, showing a small glassy prodissoconch; lunular depression striated, lanceolate, not circumscribed; escutcheon long, lanceolate, striated, the valve margins a little elevated, the area strongly impressed, bounded on each side by two flattened rays, separated by a feeble depression, extending from the beaks to the end of the rostrum, and crossed by a series of small, distant, evenly equally spaced, elevated lamellae; body of the shell swollen, the rostrum compressed; anterior end very short; sculpture of concentric, narrow, rounded ridges with wider channelled interspaces, about twenty-five between the beaks and the base; general form as figured. Lon. of shell, 8.5; of beaks behind the anterior end, 2.5; alt. 4.0; diam. 2.5 mm.

U. S. S. "Albatross," station 3354, Gulf of Panama, in 322 fathoms, mud, bottom temperature 46° F. U. S. N. Mus. 122,915. Also at station 2792, off Manta, Ecuador, in 401 fathoms, mud, temperature 42°.9.

There are fourteen anterior and about nineteen posterior very small and close-set teeth on the hinge line, the two series separated by a very small and inconspicuous chondrophore. The interior is brilliantly glossy, translucent, and with a low longitudinal ridge dividing the channel of the rostrum. The most nearly related species, from which this is sufficiently distinct, is *Leda hamata* Carpenter, of the coast of California.

Leda (Leda) loshka Dall, n. sp.

Plate 17, figure 2.

Shell thin, olivaceous, paler toward the umbones, very inequilateral, polished, the disk oval, the posterior end produced in a long rostrum; beaks low, the prodissoconch not differentiated; lunule impressed, very narrow, lanceolate, bounded by a low but sharp carina; escutcheon narrow, impressed, striated, very long, extending from the beaks to the end of the rostrum, the valve margins more or less prominent; the area is bounded by two obscure flattish ribs, the lower wider, separated by a narrow furrow and extended to the end of the rostrum; disk apparently smooth, but under a lens showing fine concentric and a few irregular faint radial striations; dorsum and base gradually attenuated, the rostrum not separated by any marked constriction near its origin; interior glassy, the rostrum with an internal keel corresponding to the external furrow; resilium very small, wholly internal, obliquely directed backward; hinge with about fifteen anterior and twenty-two posterior very small, short, angularly folded teeth. Lon. of shell, 16.2; of beaks behind anterior end, 5.0; alt. 6.5; diam. 3.0 mm. The teeth were counted on a valve 13 mm. long.

U. S. S. "Albatross," station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F. U. S. N. Mus. 122,916.

The most nearly related species is *Leda cestrota* Dall, from the Atlantic, which is a much larger form with a recurved rostrum.

Leda (Leda) rhytida Dall, n. sp.

Shell small, elongate-ovate, slightly inequilateral, translucent white, covered with a pale olive-gray periostracum; beaks low, adjacent, lunule and escutcheon not defined; anterior end evenly rounded, posterior more produced and attenuated but not acute; base evenly arcuate; surface with concentric riblets closely adjacent, finer near the umbones, coarser and rounded near the base, extending over the whole surface except the upper posterior part, where they become obsolete; interior polished, the scars hardly visible, the pallial sinus shallow; hinge with about eleven anterior and nine posterior, more or less folded teeth separated by a deep though small resiliary pit. Lon. 4.5; lon. of beaks behind the anterior end, 2.0; alt. 2.7; diam. 1.5 mm.

U. S. S. "Albatross," station 3422, off Acapulco, Mexico, in 141 fathoms, mud, bottom temperature 53°.5 F. U. S. N. Mus. 122,918.

Easily distinguished from the preceding by its wrinkled surface and strongly recurved rostrum, and from the *Leda cordyla* group by its olivaceous instead of reddish brown periostracum.

Leda (Leda) peruviana Dall, nom. prov.

Shell large, slender, rostrate, with a dark brown periostracum, the surface mostly smooth but with a few coarse irregular wrinkles on the basal half of the disk anteriorly; with about fifteen anterior and thirty-eight posterior hinge teeth; with a large obliquely posteriorly directed chondrophore, a short but strong longitudinal septum in the channel of the rostrum, and no perceptible pallial sinus. Lon. 22, anterior segment, 7; alt. 9.5; double diam. 6.0 mm.

A single decayed valve was dredged in 1036 fathoms, mud, off Aguja Point, Peru, at station 4654.

This resembles one of the *pernula* group of Arctic Ledas, but is clearly distinct from any other, reported from the region under consideration.

Spinula Dall, subg. nov.

Shell rostrate, acute behind, smooth, with a well-developed short amphidetic ligament, an internal resilium supported by triangular chondrophores, a defined lunule and escutcheon; a long, slender, completely united siphon, no palpal tentacles; pallial sinus obsolete. Type, *Leda calcar* Dall.

The type of this group has a hinge and ligament so strong that it has been impossible to open a specimen without breaking the valves, and even then the hinge would not separate. The resilium is black, plainly visible from below within the shell.

The animal has a long, contractile, slender siphonal tube, but there are no pallial muscles for retracting it, and apparently no marked sinuation of the pallial line. Mantle margin simple. Foot like that of Leda proper, the sole fringed and rather short. Gills short, palpi strong but without any accessory tentacles. The valves closed accurately. The adductor muscles seemed slender. The ligament is well developed and distinctly defined, short and about equally extended on each side of the beaks.

The *Nucula excisa* of Philippi, called *Malletia excisa* by Jeffreys, is a species of this group; the chondrophore is between the two series of teeth and well-marked.

Leda (Spinula) calcar Dall, n. sp.

Plate 10, figures 1, 10.

Shell compressed, tightly closed, acutely rostrate, brilliantly polished, smooth, covered with an olivaceous periostracum, inequilateral; beaks small, slightly elevated, adjacent, vertically overhanging a delicate, rather long, amphidetic ligament, which extends about equally in front of and behind the beaks; lunule lanceolate, long, narrow, compressed, the valve margins most prominent, delimited by faintly impressed lines; anterior dorsal margin gently arcuate; escutcheon similar to the lunule but smaller and limited by elevated lines, outside of which is a depressed space bordered externally by a strong radial keel extending from the beaks to the extremity of the rostrum; posterior dorsal margin nearly straight, posterior end acutely angular, with a wide shallow sulcus below, setting off the rostrum; anterior end rounded, slightly attenuated, basal margin exclusive of the rostrum, evenly arcuate; surface of the disk smooth or with faint concentric irregularities due to growth, and occasional faint microscopic radial striae which seem to be confined to the periostracum; interior porcellanous, polished; hinge with 16–17 anterior and about the same number of posterior teeth, the two series separated by a small triangular pit containing a well-developed though small black resilium, plainly visible from below in the closed valves; according to the lines of growth the young shells will be even more acutely rostrate than the adults. Lon. of shell, 15.2; of rostrum, 2.5; of posterior dorsal slope, 9.5; alt. 8.2; diam. 4.0 mm.

U. S. S. "Albatross," station 4658, off the Peruvian coast, in S. Lat. 8° 30′, W. Lon. 85° 36′, in 2370 fathoms, green mud, bottom temperature 35°.3 F. U. S. N. Mus. 110,573.

This is a remarkable form which I have found it difficult to place.

Leda (Spinula) calcarella Dall, n. sp.

Shell resembling *L. calcar*, but smaller, more compressed proportionately, with a shorter rostrum and blunter posterior end, feebler dorsal keels, and with, on the disk near the base, six or eight impressed lines not coincident with the lines of growth, and more or less resembling the lines on *Yoldia lanceolata* of authors. Lon. of shell, 9.0; of rostrum, 0.7; of dorsal slope, 5.0; alt. 5.7; diam. 2.0 mm.

U. S. S. "Albatross," station 4656, off the coast of Peru, in S. Lat. 6° 55′ and W. Lon. 83° 34′, in 2222 fathoms, green mud, bottom temperature 35°.2 F. U. S. N. Mus. 110,575.

This form is not fully adult and might be regarded as the young of *Leda calcar* were it not that the profile of the latter, as indicated by lines of growth, is quite different in the specimens collected; and also on account of the presence of the impressed lines on the disk. These differences would ordinarily be regarded as specific, and unless the range of variation in *Leda calcar* is much larger than usual, will prove to be specific in the present case.

YOLDIINAE.

YOLDIA Möller.

Yoldia Möller, Ind. Moll. Groenl., 1842, p. 18; 1st species, *Yoldia hyperborea* Lovén.

Möller's first species, which he erroneously identified with the *arctica* of Gray, is of the same group as the better known *Y. limatula* Say. His second and only other species, which he described under the name of *Y. angularis*, is synonymous with *Y. thraciaeformis* Storer.

The first species is generally recognized as the type of the genus. It has the ligament external, reduced to a mere film or obsolete nonfunctional remnant, sometimes focussed in a minute spot just behind the beaks, sometimes amphidetically spread along the hinge margin but distinguishable, if at all, only by its darker brown or blackish color from the periostracum with which it is continuous. In some of the southern species, however, there is a well-defined functional opisthodetic ligament, and for these it seems reasonable that the character should be recognized by a sectional name. For this the name Katadesmia is now proposed with the following species as type.

Yoldia (Katadesmia) vincula Dall, n. sp.

Plate 5, figure 5.

Shell having on a small scale much the form of *Sanguinolaria rosea*, equivalve inequilateral, white with a pale olivaceous periostracum, smooth, brilliantly polished; beaks low, very inconspicuous, nearer the anterior end; lunule and escutcheon narrow, sublanceolate, elongate, defined by small elevated ridges; external ligament about one fourth as long as the escutcheon, opisthodetic; anterior end evenly rounded from beaks to base; posterior end attenuated and pointed, the posterior basal margin obliquely truncated, extreme point gently rounded and laterally compressed; interior opaque white, showing little trace of muscular impressions, the margins entire; chondrophore and resilium, internal, triangular, vertical, not very large; anterior hinge margin with fifteen, posterior with about twenty-five teeth. Lon. of shell, 14; of beaks behind the anterior end, 6; alt. 8; diam. 4.5 mm.

U. S. S. "Albatross," station 3360, in 1672 fathoms, sand, Gulf of Panama, bottom temperature 42° F. U. S. N. Mus. 122,903. Also at stations 3354 and 3361, in 322 fathoms, mud, bottom temperature 46° F., and 1471 fathoms, green ooze, temperature 36°.6 F., respectively.

The species is notable for its pale color and brilliant polish.

ORTHOYOLDIA Verrill and Bush.

Orthoyoldia Verrill and Bush, Amer. Journ. Sci., 1897, ser. 4, **3**, p. 55; type, *Yoldia scapania* Dall.

Yoldia (Orthoyoldia) panamensis Dall, n. sp.

Shell small, narrow, elongate, very inequilateral, brilliantly polished, glassy with an olivaceous periostracum, rather compressed but not flattened; beaks very low, inconspicuous, adjacent; lunule and escutcheon almost linear, bounded by low but distinct ridges; surface absolutely smooth except for faint traces of incremental lines; dorsal slopes almost straight, the anterior much shorter; extremities subequally rounded, the posterior somewhat the most blunt; base a little more convex in front of and under the umbones; profile slightly attenuated behind the umbones; interior glassy, scars invisible, hinge plate with eighteen interior and 52–27 posterior, small, subequal teeth; margins entire. Lon. of shell, 16.5; of beaks behind anterior end, 6.5; alt., 7.5; diam., 4.0 mm.

U. S. S. "Albatross," station 3354, Gulf of Panama, in 322 fathoms, mud, bottom temperature 46° F. U. S. N. Mus. 122,900. Also at station 3355, in 182 fathoms, shelly bottom, temperature 54°.1 F.

The resilium is small, vertical, triangular, and wholly internal. There is no visible external ligament.

This species groups with the *Y. scapania* Dall, from the South Atlantic and *Y. solenoides* Dall, from the West Indies.

YOLDIELLA Verrill and Bush.

Yoldiella Verrill and Bush, Amer. Journ. Sci, 1897, ser. 4, **3**, p. 55; type, *Yoldia lucida* Lovén.

Yoldia (Yoldiella) chilenica Dall, n. sp.

Shell small, tumid, white with a polished pale yellow periostracum, inequilateral, the anterior side shorter, rounded; posterior longer, rounded below, straight above, and almost pointed at the upper posterior angle; ligament obscure, amphidetic; beaks low, adjacent, showing the protoconch; no lunule, a feebly impressed escutcheon with the valve margins medially prominent; surface of the disk feebly, irregularly, concentrically striated; valves not gaping; interior white, porcellanous, with a wide but short pallial sinus, rounded in front; seventeen posterior and nineteen anterior hinge teeth separated by a short gap with a small, deep, triangular pit for the resilium. Length of shell, 11.5; of posterior end, 6.0; alt. 6.5; max. diam. 5,2 mm.

U. S. S. "Albatross," station 2781, on the southern coast of Chile (Lat. 51°

52′ S.), in 348 fathoms, mud, bottom temperature 50° F. U. S. N. Mus. 96,923. Also at station 2782, in 258 fathoms, mud, temperature, 48° F.

This pretty little species looks something like the young of *Y. thraciaeformis* (cf. Hanley, Mon. Nuculacea, fig. 4), but is entirely unlike any species reported from the region mentioned.

Yoldie (Yoldiella) indolens Dall, n. sp.

Shell small, tumid, translucent, with a dull olivaceous periostracum, smooth surface and oval form, except that there is a slight angulation near the posterior end of the hinge line; anterior end shorter, rounded, base evenly arcuate; posterior end slightly compressed and angulated above; interior porcellanous; hinge-line with about a dozen teeth on each side of a deep, small pit for the resilium directly under the low beak; pallial sinus distinct but small. Length of shell, 5.25; of posterior end, 3.25; alt. 3.5; max. diam. 2.25 mm.

U. S. S. "Albatross," station 2784, on the southern coast of Chile, in 194 fathoms, mud, bottom temperature 51°.9 F. U. S. N. Mus. 122,740. Also at station 2785, in 122 fathoms, temperature 48° F.

A comparison of the young of *Y. chilenica* of the same size with adults of the present species shows that, although of very similar profile, in addition to the differences of color and surface *Y. chilenica* at that age is much less inflated.

Yoldia (Yoldiella ?) infrequens Dall, n. sp.

Shell very small, callistaeform, tumid, inequilateral, covered by an olivaceous periostracum; beaks prominent, tumid; both ends of the shell evenly rounded, the posterior not attenuated; anterior hinge line with about nine, posterior with thirteen teeth, separated by a very small pit for the resilium; interior chalky; exterior surface evenly, finely, concentrically striated, the sculpture fainter toward the ends of the shell. Length, 4.4; of anterior end, 2.0; alt. 3.5; max. diam. 2.0 mm.

U. S. S. "Albatross," station 2784, in 194 fathoms, mud, off the coast of southern Chile, bottom temperature 51.°9 F. U. S. N. Mus. 110,692. Also at station 2783, in 122 fathoms, mud, temperature 48°.

A very simple little species which agrees with no other of the region and is evidently adult.

Yoldia (Yoldiella ?) mantana Dall, n. sp.

Shell small, elongate-oval, white, with a pale yellowish periostracum, nearly equilateral, the beaks opisthogyrate, showing the protoconch distinctly; anterior end expanded, evenly rounded; posterior end somewhat attenuated, at the end rounded; surface with a few irregular concentric striae, but mostly smooth and polished; interior chalky, with a shallow but distinct pallial sinus; hinge with about nine anterior and ten or eleven posterior teeth between which the minute resilium is set apparently directly on the edge of the valve, no pit or chondrophore being visible under a lens. Length of shell, 5.0; of anterior end, 2.5; alt. 3.2; max. diam. 2.5 mm.

U. S. S. "Albatross," station 2792, in 401 fathoms, mud, off Manta, Ecuador, bottom temperature 42°.9 F. U. S. N. Mus. 122,756.

Yoldia (Yoldiella) granula Dall, n. sp.

Shell minute, oval, equilateral, moderately tumid, smooth, covered with a polished straw-colored periostracum; interior porcellanous, with a very slight pallial sinus and smooth margins; hinge line with about six teeth on either side of a well-developed resilium, the most anterior tooth of all a little more distant and notably larger than any of the others. Length, 1.7; alt. 1.2; max. diam. 1.0 mm.

U. S. S. "Albatross," station 2778, in Magellan Straits, in 61 fathoms, bottom temperature 47°.9 F. U. S. N. Mus. 110,693.

Only a single valve was obtained of this very minute species, but the solidity of the specimen indicates that it is not the fry of one of the above described larger species.

Yoldia (Yoldiella) dicella Dall, n. sp.

Shell small, solid, chalky-white, covered by a dark olive dull periostracum, slightly inequilateral, with low, adjacent beaks; of oval form, and with neither lunule nor escutcheon; anterior end broadly rounded, posterior narrower and longer, but also rounded, base evenly arcuate; surface nearly smooth at the umbones, but feebly concentrically striated on the disk, especially the lower part of it; without any radial sculpture; interior chalky-white, the margins entire, the muscular scars distinct, the pallial line with a shallow, hardly angular sinus; hinge line with about ten anterior and fifteen posterior small crowded teeth, separated by a deep pit occupied by the entirely internal resilium. Lon. of shell, 6; of beaks behind the anterior end, 3; alt. 4; diam. 3 mm.

U. S. S. "Albatross," station 3418, off Acapulco, Mexico, in 660 fathoms, sand, bottom temperature 39° F. U. S. N. Mus. 122,917.

This little spade-shaped species is clearly distinct from any of the others considered in this paper.

Yoldia (Yoldiella) leonilda Dall, n. sp.

Shell small, smooth, oval, subequilateral, plump, white, covered with a polished pale straw-colored periostracum; beaks low, eroded, slightly nearer the anterior end; no external ligament, lunule or escutcheon; ends subequal, the anterior more rounded, the posterior roundly pointed, the extremes slightly above the equator of the disk; surface smooth, except for lines of growth; interior white, dull, the scars hardly visible; margins entire and prominently arcuate basally; resilium strong, internal; hinge plate with about twelve anterior and fourteen posterior teeth, separated by a chondrophore large for the size of the shell. Lon. of shell, 8; alt. 5; diam. 3.75 mm.

U. S. S. "Albatross," station 3360, Gulf of Panama, in 1672 fathoms, sand, bottom temperature 42° F. U. S. N. Mus. 122,909.

MALLETIINAE.

MALLETIA Desmoulins.

Malletia Desmoulins, Actes Soc. Linn. de Bordeaux, Feb., 1832, **5**, p. 85; type, *M. chilensis* Desm.

Solenella Sowerby, P. Z. S. Lond., 1832 (Dec.), p. 197; type, *S. norrisii* Sowerby; Conch. Man., 1839, p. 99, fig. 138.

Ctenoconcha Gray, Syn. Brit. Mus, 1840; ed. 1842, pp. 77, 91; Sowerby, Conch. Man., 1842, 2d ed., p. 128; Orbigny, Voy. Amer. Mér., Moll., 1846, p. 543.

Neilo A. Adams, P. Z. S. Lond., 1852, p. 92; type, *N. cumingi* Adams, *l. c.*, p. 93, = *Nucula australis* Quoy et Gaim., Voy. Astrolabe, Zool., 1833, **8**, p. 471, pl. **78**, figs. 5–10.

The type is from Valparaiso, Chile, in 14 to 45 fathoms, mud; Cuming.

Malletia magellanica Mabille and Rochebrune.

Malletia magellanica Mabille et Rochebrune, Miss. Sci. du Cap Horn, Mollusques, 1889, p. H 114, pl. **8**, fig. 1.

Malletia hyadesi Mabille et Rochebrune, *op. cit.*, p. H 114, pl. **7**, fig. 8.

Punta Arenas, Magellan Strait, Hyades. U. S. S. "Albatross," station 2779, Straits of Magellan, in 77 fathoms, ooze, bottom temperature 47° F. Also at station 2780, in 369 fathoms, mud, temperature 47°, and 2772, off Cape Virgins, in 31½ fathoms, sand. U. S. N. Mus. 96,238.

This species differs from *M. chilensis* Desmoulins, by its smaller size, more ovate form, less conspicuous marginal indentations, and a larger number of anterior hinge teeth. The *M. hyadesi* is only a somewhat larger and older specimen than that figured as *M. magellanica*. I have no doubt of their identity. *M. magellanica* Smith, is much more acutely pointed behind.

Malletia inequalis Dall, n. sp.

Shell oval, compressed, the anterior side longer, surface smooth, or showing only incremental lines, covered with a thin polished brownish olive periostracum;

anterior dorsal margin evenly arcuate, posterior straighter, both ends rounded, the posterior more bluntly; posterior depressed ray obsolete, anterior wanting, though in its place are three or four very faint radial striae; base evenly arcuate, interior earthy, white, pallial sinus large, rounded behind, below mostly coincident with the pallial line; hinge line short with a wide gap under the beaks, three anterior and twenty-four posterior minute crowded teeth; beak low, pointed, opisthogyrate; no lunule or escutcheon. Length of shell, 26; of anterior end, 15; alt. 17; diam. 6 mm.

U. S. S. "Albatross," station 2772, off Cape Virgins, in 31 fathoms, sand, and 2778, Straits of Magellan, in 61 fathoms, mud, bottom temperature 47°.9 F.

The truncation behind, the coalescent pallial sinus, and the compressed form separate it from the other species.

Malletia peruviana Dall, n. sp.

Plate 10, figures 3, 5.

Shell thin, oval, polished, of a very dark olivaceous tint, inequilateral, with a marked anterior basal gape; beaks low, eroded, inconspicuous, anterior, with a wholly external, elongated, chiefly opisthodetic ligament and no resilium; anterior dorsal slope short, compressed, slightly arcuate; posterior straight, much longer, compressed; no lunule or escutcheon; anterior end attenuated, roundly pointed, posterior broader, rounded, with a feebly impressed ray from the beaks ending in an inconspicuous insinuation of the posterior lower margin; surface smooth except for this ray and incremental concentric slight undulations; interior bluish white, porcellanous; muscular scars distinct, pallial sinus small and very shallow, deepest near the adductor scar; a strongly impressed dorsally concave arcuate linear impression extending backward and upward from the anterior adductor scar into the back part of the umbonal cavity; hinge with small and crowded not always clearly differentiated teeth, anterior about ten, posterior about thirty-three; valve margins entire. Lon. of shell, 28; of part anterior to the beaks, 9; alt. 16.5; diam. 9.5 mm.

U. S. S. "Albatross," station 4654, N. 68° W., twenty-four miles from Aguja Point, Peru, in 1036 fathoms, mud, bottom temperature 37°.3 F. U. S. N. Mus. 110,574.

The species is remarkable for its almost blackish color and extremely shallow pallial sinus, which does not extend in front of the posterior adductor scar; the anterior end is unusually short and almost pointed.

Malletia truncata Dall, n. sp.

Plate 17, figure 1.

Shell brilliantly polished, smooth, with a pale, olivaceous periostracum, inequilateral, subrectangular, with a strong, external, opisthodetic ligament and traces of a minute, subinternal resilium; beaks small, low, adjacent, nearer the anterior end; lunule and escutcheon present but practically linear; anterior slope slightly convexly arcuate, anterior end evenly rounded; posterior dorsal slope slightly concavely arcuate to an angle near the end of the hinge plate; posterior end almost truncate, very bluntly rounded, compressed, wider than the anterior end; basal margin subparallel with the posterior dorsal, convexly gently arcuate; interior porcellanous white; scars moderately distinct, pallial sinus deep, wide, rounded in front; hinge with twenty anterior and about twenty-seven posterior, short, folded, delicate teeth; a smooth gap between the two series, in the upper edge of which can be detected traces of the obsolete resilium; valve margins entire. Lon. of shell, 22.5; of beaks behind anterior end, 8.5; alt. 12.5; diam. 8.0 mm.

U. S. S. "Albatross," station 3374, southwest of Malpelo Island, Gulf of Panama, in 1823 fathoms, ooze, bottom temperature 36°.4 F. U. S. N. Mus. 122,906. Also at station 3361, in 1471 fathoms, ooze, temperature 36°.6 F., and 3381, in 1772 fathoms, green mud, temperature 35°.8 F.

Remarkable for its light yellow color, its surface devoid of radial sculpture or indented margin, and its bluntly truncate posterior end. In the latter character and its subequal division of the hinge teeth it recalls Neilo, but is without the rostration of that form.

MINORMALLETIA Dall, sect. nov.

Shell small, blunt, plump, with amphidetic ligament, no resilium, the pallial sinus large, no radial depressions or sculpture.

Malletia (Minormalletia) arciformis Dall, n. sp.

Plate 15, figures 5, 6.

Shell very thin, inflated, rounded-quadrate, inequilateral, finely concentrically striated, of a dull olivaceous color; hinge line nearly straight, subangulate where it joins the semicircular arc of the posterior end; anterior end shorter, narrower, rounded; base rather straight; beaks low, very anterior, prosocoelous over a narrow amphidetic ligament; hinge line interrupted with ten anterior and about thirteen posterior teeth; muscular impressions deep, a large pallial sinus below the posterior scar, confluent with the pallial line below; interior of the valves whitish, earthy. Lon. 10.6; alt. 7.0; diam. 6.0; beak behind anterior end, 3.3 mm.

U. S. S. "Albatross," station 3417, off Acapulco, Mexico, in 493 fathoms, mud, bottom temperature 40°.6 F. U. S. N. Mus. 122,926.

Though more rounded below and behind, this has a profile not dissimilar to that of *Arca* (*Fossularca*) *adamsi* E. A. Smith.

The pallial sinus is notable in that the greater part of its basal scar is identical with the pallial line itself, whereas in most of the Malletinae the sinus tends to slope obliquely upward.

Malletia (Minormalletia) benthima Dall, n. sp.

Plate 15, figures 1, 2.

Shell small, thin, earthy, covered with a polished, thin, grayish periostracum; very inequilateral, bluntly rounded in front and behind; beaks pointed, recurved, prominent; situated at the anterior third; surface smooth, except for lines of growth and very sparse, faint, radial striations which appear confined to the periostracum; posterior hinge line and base nearly parallel; ligament very delicate, amphidetic but mostly behind the beaks; resilium minute, obscure, not interrupting the line of teeth; anterior teeth 12–13, posterior 17–18, small and closely crowded; interior earthy, polished, the muscular scars pronounced, small; pallial sinus large, deep, rounded behind, reaching nearly to the middle of the shell, rising obliquely from the entrance; no lunule or escutcheon. Beaks in front of the posterior end, 6.5; anterior end of sinus, 4.5; total length, 9.5; alt. 5.3; diam. 4.0 mm.

U. S. S. "Albatross," station 3417, off Acapulco, Mexico, in 493 fathoms, mud, bottom temperature 40°.6 F. U. S. N. Mus. 122,927.

A very plain and simple but rather peculiar looking species.

NEILO A. Adams.

Malletia (Nelro) goniura Dall.

Plate 18, figure 6.

Malletia goniura Dall, Proc. U. S. Nat. Mus., 1889, **12**, p. 251, pl. **10**, fig. 10.

Shell extremely thin and fragile, translucent whitish, covered with a rather dark olive periostracum, smooth and polished; beaks low, adjacent, nearest the anterior end of the shell, with a linear lunule and escutcheon, a long and strong external ligament but no internal resilium; anterior dorsal slope arcuate, short, passing insensibly into the curve of the evenly rounded anterior end; posterior longer, straight, ending in an obtuse angle at the posterior truncation; a single elevated small thread or keel extends from each beak to the lower posterior margin of the valve, above which the valve is somewhat excavated; the upper border of this trough or excavation is slightly prominent, though not indicated by a keel, and the margin between the radial thread and this prominence is somewhat concave, produced at the end of the prominence and thence obliquely truncate to the dorsal margin, which is compressed; the posterior end of the shell, except for the undulation mentioned, is abruptly truncate and meets the base at a bluntly rounded angle, the base being nearly straight and the whole profile of the shell subrectangular; interior translucent whitish, scars perceptible, the pallial sinus shallow, rounded in front; hinge plate straight with about fourteen anterior and over thirty very small anterior teeth, the gap separating the two series very slight. Lon. of shell, 13.0; of beaks behind the anterior end, 5.5; alt. 8.0; diam. 5.0 mm.

U. S. S. "Albatross," station 3360, Gulf of Panama, in 1672 fathoms, sand, bottom temperature 42° F. U. S. N. Mus. 122,908. Also off the coast of Ecuador, at station 2793, in 741 fathoms, mud, temperature 38°.4 F.

TINDARIA Bellardi.

Tindaria compressa Dall, n. sp.

Plate 15, figures 7, 8; Plate 17, figures 15, 16.

Shell small, thin, cythereiform, pale yellow, moderately convex, inequilateral, the anterior end shorter, the entire surface minutely, evenly, concentrically striated: beaks low, prosocoelous, with no defined lunule but a flattish space in front of them; ligament small, amphidetic; posterior slope slightly arcuate, with a long lanceolate escutcheon, defined by an impressed line; anterior and posterior ends rounded, base evenly arcuate; interior white, porcellanous; hinge with about ten anterior and twenty-one posterior teeth, a rather wide mesial gap, between the two series; basal margin entire. Lon. 8.2; height, 6.0; max. diam. 4.3; beaks behind the anterior end, 3.0 mm.

U. S. S. "Albatross," station 3360, in 1672 fathoms, sand, bottom temperature 42° F. U. S. N. Mus. 122,921.

A larger specimen of the same species, but with twelve anterior and twenty-five posterior teeth, measures: lon. 11.5; alt. 8.5; diam. 6.0; and the beaks behind the anterior end, 4.7 mm. It was dredged at station 3414, southwest of the isthmus of Tehuantepec, in 2232 fathoms, green mud, bottom temperature 38°.5 F. U. S. N. Mus. 122,923.

This species recalls *Tindaria amabilis* Dall, of the Antilles, by its form and color, but it is less solid and inflated, and more attenuatedly compressed behind. In the former species the ligament is nearly equally distributed in front of and behind the beaks, but in *T. compressa* the larger part is posterior.

Tindaria salaria Dall, n. sp.

Shell pale cream color or white, nuculiform, smooth on the beaks, near the dorsal slopes and ends of the shell; basally concentrically striated, polished; the shell is very nearly the shape of a small *Nucula proxima* Say; ligament small, amphidetic, mostly posterior; resilium obsolete or none; there is no trace of a chondrophore; hinge line arched, with no lunule, the escutcheon narrow, long, feebly defined; interior white, porcellanous, polished; pallial line not sinuated, margins entire; hinge with seven to eight anterior and eighteen to twenty posterior hinge teeth, small below the beaks, but forming an apparently continuous arch with no central gap. Length of shell, 5.5; alt. 4.5; max. diam. 3.0 mm.

A few dead valves and fragments dredged in Mid-Pacific, off Salar y Gomez Island, at U. S. S. "Albatross," station 4693, in 1142 fathoms, manganese nodules, bottom temperature 35°.4 F.

This species is more nuculiform than any of the other described species.

Tindaria panamensis Dall, n. sp.

Plate 17, figures 10, 12.

Shell small, not polished, veneriform, evenly, closely, concentrically threaded, the grooves sharp; dark olivaceous green, darker near the margin, very thin, the valves slightly compressed at the posterior third, behind which the sculpture becomes suddenly finer; beaks low, plump, rather anterior, with no lunule and only a narrow, feebly defined escutcheon; ends rounded, the base arcuate with a faint inflection at the point of compression, ligament small, almost imperceptible; hinge with seven anterior and about thirteen posterior teeth; margins entire; ends subequally rounded. Lon. 5.5; alt. 4.3; max. diam. 2.8; beaks behind the anterior end, 2.0 mm.

U. S. S. "Albatross," station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F. U. S. N. Mus. 122,922.

Of a more greenish color and dull surface than any of the previously described veneriform species.

Tindaria atossa Dall, n. sp.

Plate 15, figures 3, 4.

Shell small, olivaceous, moderately polished, finely concentrically striated all over, with the beaks slightly anterior, the posterior end bluntly pointed, the anterior rounded; ligament small, amphidetic; anterior teeth six, posterior ten, the dorsal slopes gently, the basal margin roundly, arcuate; interior white, margin entire. Lon. 3.5; height, 2.2; max. diam. 1.7; beaks behind the anterior end, 1.7 mm.

U. S. S. "Albatross," station 3393, Gulf of Panama, in 1020 fathoms, mud, bottom temperature 36°.8 F. U. S. N. Mus. 122,924.

Resembling the last species, but with the whole surface sculptured and the posterior end less elongated and pointed.

At station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F., was found another specimen, U. S. N. Mus. 122,920, which is apparently the adult form. It resembles the smaller ones above described, but measures: lon. 6.5; alt. 4.5; max. diam. 3.0; beaks behind anterior end, 2.5 mm. Since this is considerably larger than the specimens above referred to, it will be considered as the type.

Tindaria smirna Dall n. sp.

Plate 17, figures 6, 7.

Shell small, polished, subtriangular, of a blackish olive tint, plump, the beaks nearer the anterior end; posterior end acutely pointed, anterior bluntly rounded; beaks low, with a small black ligament extending on both sides of them; anterior slope short, straight, posterior longer, flattened; neither lunule nor escutcheon present; valves smooth on the beaks and over two thirds of the surface, but near the basal margin with about ten fine concentric grooves, crossed by very fine radial striae; basal margin evenly arcuate; interior dull pearly, the hinge with about eight anterior and twelve posterior teeth. Lon. 5.5; height, 4.0; max. diam. 2.7; beaks to anterior end, 2.0 mm.

U. S. S. "Albatross," station 3360, Gulf of Panama, in 1672 fathoms, sand, bottom temperature 42° F. U. S. N. Mus. 122,919.

Pretty close to *T. atossa*, but much more brilliantly polished, the shell shorter, more turgid, more nearly equilateral, and with the ligament distinctly and subequally amphidetic, while in *T. atossa* it appears, to the naked eye, to be entirely opisthodetic, though on opening the valves a small portion is seen to pass in front of the beaks.

Tindaria mexicana Dall, n. sp.

Plate 17, figures 11, 14.

Shell small, solid, rounded-triangular, subequilateral, olivaceous, polished; beaks prominent, prosocoelous, slightly anterior, inflated, concentrically minutely threaded; the sculpture extends to the middle of the base, is a little less conspicuous on the dome of the valve and almost entirely absent near both ends, ceasing rather abruptly; anterior slope short with no lunule, the anterior end rather attenuated, rounded; posterior end longer, somewhat attenuated, the dorsal slope flattish, the end rather abruptly rounded; base roundly arcuate; ligament minute, amphidetic; anterior hinge line with eleven, posterior with about twenty-one teeth, the central ones small and obscure; interior porcellanous. Lon. 5.2; alt. 4.0; diam. 2.8; beaks behind anterior end, 2.0 mm.

U. S. S. "Albatross," station 3418, off the Mexican coast in 660 fathoms, sand, bottom temperature 39° F. U. S. N. Mus. 122,925.

Very similar to *T. smirna*, but with more prominent beaks; shorter and blunter, in proportion to height, and decidedly less pointed and produced behind.

Tindaria virens Dall.

Malletia (*Tindaria*) *virens* Dall, Proc. U. S. Nat. Mus., 1889, **12**, p. 254, pl. **13**, fig. 8.

Coast of Southern Chile and Western Patagonia at U. S. S. "Albatross," stations 2781, 2782, 2783, 2784. and 2785, in 122 to 449 fathoms, mud, bottom temperatures 47° F. to 51°.9 F.

Lighter colored, with alternating zones and with sharper and deeper concentric sulci, than those exhibited by *T. atossa* of the Panama fauna, which is the most nearly related species.

Tindaria thea Dall, n. sp.

Shell small, thin, equivalve, inequilateral, very dark olive, plump, polished; beaks anterior, high, slightly prosogyrate; lunule not defined, a lanceolate impression in the region for the escutcheon is not distinctly delimited; anterior slope short, slightly arcuate, the valve margins slightly raised, the anterior end rounded; posterior slope longer, straighter, posterior end attenuated and bluntly pointed; basal margin prominently arcuate; surface smooth except for minute concentric undulations extending from the beaks to the base over the whole disk, best seen under a lens; interior porcellanous, margins entire, scars distinct, hinge with eight anterior and twelve to fourteen posterior teeth, the series not separated by a pit containing a small, internal resilium. Lon. 6.5; anterior end, 1.5; alt. 4.0; diam. 3.0 mm., the posterior extreme somewhat compressed.

U. S. S. "Albatross," station 4654, N. 68° W., twenty-four miles from Aguja Point, Peru, in 1036 fathoms, mud, bottom temperature, 37°.3 F. U. S. N. Mus. 110,577.

Just about the color of dark wet tea-leaves after they have been steeped. Longer and more pointed, and more attenuated behind, than *T. smirna*, which has very similar sculpture but a more yellowish color. In looking from below, the series of hinge teeth seems uninterrupted, but the black color of the semi-internal resilium can be seen through the interstices, as it is situated above the tooth-line.

Tindariopsis Verrill and Bush.

Tindariopsis V. and B., Am. Journ. Sci., 1897, ser. 4, **3**, p. 59; type, *T. agathida* Dall, Proc. U. S. Nat. Mus., 1889, **12**, p. 252, pl. **13**, fig. 10.

Tindaria (Tindariopsis) sulculata Gould.

Nucula sulculata Couthouy, in Gould, Wilkes' Expl. Exped., Moll., 1852, p. 424, pl. **37**, figs. 539 a–e.

Leda sulculata Hanley, Thes. Conch., 1860, **3**, Mon. Nuculacea, p. 25, footnote; not *Lembulus* (= *Leda*) *sulculatus* Risso, Eur. Mérid., 1826, **4**, p. 320.

Leda lugubris A. Adams, P. Z. S. Lond., 1856, p. 49; E. A. Smith, P. Z. S. Lond., 1881, p, 39; Mabille et Rochebrune, Mission Cap Horn, 1889, **6**, Moll., p. H 113.

Leda orangica Mabille et Rochebrune, Mission Cap Horn, 1889, **6**, Moll., p. H. 113, pl. **8**, fig. 3.

U. S. S. "Albatross," station 2778, Straits of Magellan, in 61 fathoms, mud, bottom temperature 47°.9 F. U. S. N. Mus. 110,697. Orange Harbor, Patagonia, Couthouy; Port Rosario and Wolsey anchorage, 17–30 fathoms, Alert Expedition.

This species seems extremely abundant, and the hundreds of specimens collected by the "Albatross" enable the full range of variation to be traced, from which the above synonymy results. The color varies from nearly black to light yellowish brown. There is a small angular pallial sinus. There is no chondrophore, and, while a small gap intervenes between the anterior and posterior rows of teeth, the resilium, which seems to be obsolete, does not occupy it. The ligament doubtfully passes in front of the beaks, unless as a mere functionless film. I have compared Gould's type, still preserved in the National Museum, with the "Albatross" specimens. The species differs from the type of *Tindariopsis* (*T. agathida* Dall) in possessing a small angular pallial sinus, and might therefore be put in a separate section if such fine discriminations be regarded as desirable in so variable a group as this.

That this species, belonging to a different genus from Risso's shell, was erroneously referred to Leda, does not oblige us to reject the name of Couthouy and Gould.

PHASEOLUS JEFFREYS.

Phaseolus (Jeffreys MS.) Monterosato, Atti Accad. Scienze, Palermo, 1875, pp. 4, 11 (*nomen nudum*); von Martens, Zool. Record for 1875, p. 205; Jeffreys (*olim*) P. Z. S. Lond., 1879, p. 573; Seguenza, Nucul. Terz. Ital., 1877, p. 1182; type, *P. ovatus* Jeffr.

Silicula Jeffreys, P. Z. S. Lond., 1879, p. 573; type, *S. fragilis* Jeffreys. *l. c.*, p. 574, pl. 45, figs. 6, 6a; Seguenza, Form. Terz. de Reggio, 1879, p. 284; Verrill, and Bush, Am. Journ. Sci., 1897, ser. 4, 3, p. 62.

Jeffreys' manuscript name Phaseolus, applied to one or two fossil species from the Italian tertiaries, was printed by Monterosato and Seguenza before Jeffreys himself had given a diagnosis. The sole example of the genus illustrated by Seguenza in 1877 was *P. ovatus*. Apparently without knowing of this publication, in describing a recent shell from the Porcupine expedition dredgings, in 1879, Jeffreys substituted for his original manuscript name another, Silicula, with a single species *S. fragilis*. These shells, though having rather a similar hinge, are otherwise quite unlike, so that in 1897 Verrill proposed to retain both names as follows, the characters having been recast from authentic specimens.

PHASEOLUS (Jeffreys MS.) Seguenza, type *P. ovatus* Jeffreys.

Shell short-ovate, the hinge subequal on each side of the beaks, the two series meeting at an obtuse angle under the beaks, valve practically equilateral; no pallial sinus, ligament? teeth lamellar, few, subequally divided.

SILICULA Jeffreys, type *S. fragilis* Jeffreys.

Shell very inequilateral, beaks at the anterior third, calyculate; an oblique chondrophore and internal resilium, external ligament obsolete; hinge line nearly straight; pallial sinus deep; valves soleniform, truncate behind and rounded in front; teeth lamellar, the posterior series much elongated, few in number.

Unless the differences, when all the characters of *Phaseolus ovatus* are known, prove greater than now appears, Silicula can hardly rank higher than as a subgenus of Phaseolus, especially if, as seems likely, species intermediate in form should turn up.

Phaseolus (Silicula) patagonicus Dall, n. sp.

Shell small, thin, elongate-oval, very inequilateral, anterior side shorter, anterior end rounded, anterior dorsal slope nearly straight; posterior slope very slightly curved and descending; posterior end bluntly rounded, not truncate, not emarginate, slightly smaller than the anterior end; outer surface smooth except for faint incremental lines, covered with a thin, polished, pale olive periostracum; beaks (eroded); a well-marked internal pit under them; anterior hinge line with two short horizontal teeth; posterior with four elongate, straight, overlapping lamellae; interior of the valves white, porcellanous, with a large pallial sinus rounded behind, not very deep; muscular scars small; on the disk inside of the pallial line, extending backward and upward from the anterior adductor scar, is a series of somewhat irregular but more or less continuous small scars which enclose a large oval area of which the upper boundary is the hinge line, and which reaches back to about the middle of the shell. Length, 8.4; anterior end, 2.0; alt. 4.2; max. diam. 1.8 mm.

U. S. S. "Albatross," station 2783, on the west coast of Patagonia, southern Chile, in S. lat. 51° 2′, in 122 fathoms, mud, bottom temperature 48° F. U. S. N. Mus. 96,914.

Only a single valve of this species came to light, the umbo being eroded, but the characters are abundantly sufficient to separate it from the North Atlantic species.

Arcacea.

Limopsidae.

LIMOPSIS Sasso.

Limopsis Sasso, Giorn. Ligustico, di Sci. Let. ed Arti, Genova, 1827, **1**, p. 476; type, *Arca aurita* Brocchi, *fide* Sacco.

Pectunculina Orbigny, Pal. Franc. Terr. Cret., 1844, **3**, p. 182; 1st species, *Pectunculus scalaris* Sowerby.

Trigonocoelia Nyst et Galeotti, Bull. Acad. Sci. Bruxelles, 1835, **2**, p. 289; 1st species, *Pectunculus granulatus* Lamarck.

Felicia Mabille et Rochebrune, Miss. du Cap Horn, Moll., 1889, **6**, p. H 115, sole ex. *F. jousseaumei* M. & R., p. H 116, pl. **7**, fig. 9a–b.

Cosmetopsis Rovereto, Note prev. Pelecip. Tongr. Lig., Atti Soc. Ligust., 1898, **9**, p. 177; type, *Limopsis retifera* Semper.

Sacco proposes to retain D'Orbigny's name Pectunculina for those species with stronger sculpture and denticulate valve margins, while for those intermediate between these and the smooth-edged type of *L. aurita*, Rovereto has proposed the name Cosmetopsis. These mutations of sculpture are too feeble, and in one case too characteristic of different ages in the same individual, in my opinion, to be worthy of names.

Felicia is apparently founded on a misconception. A large number of specimens were dredged by the "Albatross," and the series shows the impression of the triangular fossette to vary exceedingly in strength and when slightly eroded to be in some cases very easy to overlook. Its supposed absence, in Felicia as claimed, is thus easily accounted for.

There is, however, one good subdivision of the genus, as follows:

EMPLECONIA Dall, sect. nov.

Valves with their upper posterior margins beyond the hinge line, deeply infolded, forming a deep narrow pit between the valves when closed.

Type, *Limopsis vaginatus* Dall, Proc. U. S. Nat. Mus., 1891, **14**, p. 190; 1895, **17**, p. 713, plate **25**, figures 3, 6, 7. Bering Sea and North Pacific Ocean.

LIMOPSIS s. s.

(A. With entire margins.)

Limopsis zonalis Dall, n. sp.

Plate 7, figures 6, 9.

Shell large for the genus, compressed, oblique, ovate, whitish, clothed with a dense elongate villous periostracum of a dark brown color with narrow concentric zones which are nearly black; beaks narrow, sharp, prominent, vertically incurved over a short lozenge-shaped ligament centrally situated in a rather short, narrow, flat amphidetic area; beaks nearly smooth, the greater part of the disk covered with small, low, slightly irregular, closely adjacent ridges, bearing fringes of periostracum, crossed by very faint radial incised lines, with rather wide interspaces, from which, over the lines project long hair-like processes in thick rows, extending beyond the margins of the shell; interior polished white with broad, flat, entire margin; hinge line with eight anterior and five or six posterior, radially arranged smooth teeth, the two series separated by a short gap; anterior adductor scar small, deep, adjacent to the hinge plate; posterior scar four or five times as large and distant from the hinge plate. Alt. 25; lat. of shell, 27; of hinge area, 11.5; max. diam. 10 mm.

U. S. S. "Albatross," station 3356, Gulf of Panama, in 546 fathoms, mud, bottom temperature 40°.1 F. U. S. N. Mus. 122,878 (type). Other specimens were obtained from stations 3357 and 3358, in 782 and 555 fathoms, green sand, temperatures 38°.5 and 40°.2 and station 4630, off Mariato Point, Panama Bay in 556 fathoms, sand, temperature 38°.

The most striking thing about this species, apart from its oblique form, is externally, the dark zone in the periostracum near the margin and the clearly distinguished lines of the hairs; internally the very great discrepancy between the two adductor scars.

Limopsis compressus Dall.

Plate 7, figures 7, 8.

Limopsis compressus Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 16.

Shell large, thin, compressed, with a yellowish-brown, pale, pilose epidermis; surface reticulated with fine radiating striae and rather irregular elevated lines of growth; beaks low, but conspicuous, small and swollen; area narrow, long, about equal on each side of the beaks; dorsal line straight, anterior end rounded, posterior produced, rounded; interior white, smooth, with plain margins; posterior adductor scar larger and lower than the anterior; ligament central, lozenge-shaped, thin; hinge with about six posterior and eight anterior teeth, small, obscure, separated by a wide edentulous space, and obsolete in senile specimens. Length of shell, 45; height, 37; diam. 17.5 mm., exclusive of the hair-like processes of the periostracum.

U. S. S. "Albatross," station 3382, Gulf of Panama, in 1793 fathoms, mud, bottom temperature, 36° F. Type, U. S. N. Mus. 122,889.

Other stations are as follows:

Station.	Locality.	Fathoms.	Bottom.	Temperature F.
3360	off Panama	1672	sand	36°.4
3361	" "	1471	green ooze	36°.6
3362	" "	1175	mud	36°.8
3366	" "	1067	glob. ooze	37°.0
3374	" "	1823	green ooze	36°.4
3376	" "	1132	glob. ooze	36°.3
3414	off Mexican coast	2232	green mud	35°.8

The most conspicuous features of this species are its thin shell, very large size, short pelage, and pale color of the hairs. In general appearance it is not unlike *L. bassi* Smith, from New Zealand, which is smaller, more inflated, and thicker.

Limopsis jousseaumi Mabille et Rochebrune.

Felicia jousseaumi Mabille et Rochebrune, Miss. du Cap Horn, Moll., 1889, **6**, p. H 116, pl. **7**, figs 9a, 9b.

Beagle Channel, Murray Narrows, Hyades; U. S. S. "Albatross," station 2789, off the southern coast of Chile in latitude 53° 1′ south, in 369 fathoms, mud, bottom temperature 46°.9 F. U. S. N. Mus. 118,241; and station 2783, in 122 fathoms, mud, temperature 48°.

This species, agreeing exactly with the figure in the report of the Mission to Cape Horn, above cited, has a pale brownish periostracum with rather short hairs, prominent though small beaks, and smooth flat valve-margins. The periostracum is less adherent than usual in this genus and often has dropped off entirely in comparatively fresh specimens. The hairs are much longer in the young than in the average adult. The area is very narrow; the ligament occupies a very narrow, lozenge-shaped area about equally in front and behind the beaks; the resilium is central, forming a minute triangle in each valve, and the depression in the amphidetic area to receive it is very shallow and sometimes, in a slightly eroded valve, imperceptible, which accounts for the error already alluded to. Another error, probably typographical, occurs in printing the measurements, as will be seen on comparing them with the figure. The average measurements are: length, 26; height, 24; diam. 9 mm., exclusive of the periostracum.

The sculpture consists of feeble, irregular incremental lines and obsolete numerous, rather distant radial striae, out of which the hairs grow, the interspaces being quite flat, and the striae, broken by the lines of growth, have here and there a faintly punctate aspect. There are ten anterior and about the same number of posterior teeth, sometimes forming a continuous arch, but usually with a faint medial depression, more conspicuous in the young shells.

Nothing corresponding to the unfigured *L. hirtella* Mabille et Rochebrune, from Orange Harbor, was discovered in the "Albatross" collections.

(B. With crenulate Margins.)

Limopsis diegensis Dall, n. sp.

Plate 15, figures 13, 15.

This small, oblique-ovate, and rather swollen species is light brown, rather sparsely pilose, thin, with a small resilium, about seven anterior and four to five posterior hinge teeth, which are small and delicate, the two series separated by a short edentulous gap. When the periostracum is removed, the sculpture is not unlike that of *L. jousseaumi*, but more emphatic, and the radii are distinctly punctate. The interior is faintly grooved and the ventral margin distinctly crenulate, or rather beaded.

Off San Diego, in 80 fathoms, F. W. Kelsey; U. S. S. "Albatross," station 2923, in 822 fathoms, mud, off San Diego, California, bottom temperature 39° F. U. S. N. Mus. 122,585.

Limopsis mabilliana Dall, n. sp.

Shell small, subquadrate, with pale brown periostracum sparsely arranged along the radial and concentric sculpture so as to form a fringed reticulum, the hairs not pilose but individualized and distant; beaks small, prominent, with a very minute area and small resiliary groove, five anterior and six posterior hinge-teeth, the series hardly separated, the anterior teeth longer than the posterior; shell greenish white; base arcuate, inner margins strongly crenulate. Length, 6.0; alt. 5.5; diam. 3.0 mm.

U. S. S. "Albatross," station 2780, off the southern coast of Chile, in 369 fathoms, mud, bottom temperature 47° F. U. S. N. Mus. 110,703.

The single specimen was at first suspected to be the young of *L. jousseaumi*, with which it was dredged, but the crenulate margin showed this to be an error.

Limopsis panamensis Dall.

Limopsis panamensis Dall, Proc. U. S. Nat. Mus., Mar., 1902, **24**, p. 559; 1903, **26**, p. 951, pl. **62**, fig. 8.

U. S. S. "Albatross," station 3393, Gulf of Panama, in 1020 fathoms, mud, bottom temperature 36°.8. U. S. N. Mus. 109,028.

The characteristics of this little species are its rotundity, its blackish olive periostracum, and crenulate margins. It is of an entirely different shape from *L. mabilliana*, or the following species.

Limopsis stimpsoni Dall, n. sp.

Shell ovate, inequilateral, anterior end shorter, attenuated; posterior convexly arcuate, produced; periostracum light brown, formed much as in *L. mabilliana*; area narrow, the resilium minute; interior greenish white, radiately grooved toward the margin, which is crenulate; teeth small and feeble, five anterior and four posterior, separated by an edentulous space; the muscular scars discrepant as usual. Length of whole shell, 6.5; of posterior part, 4.0; alt. 6.2; diam. 3.5 mm.

U. S. S. "Albatross," station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature, 36°.4 F. U. S. N. Mus. 122,881. Also at station 3393, in 1020 fathoms, mud, temperature 36°.8.

I have named this species in honor of the late Doctor William Stimpson. It is nearest *L. mabilliana*, but very different in profile.

Limopsis juarezi Dall, n. sp.

Plate 18, figure 8.

Shell small, solid, white, moderately compressed, with a dense fringed brown periostracum disposed in concentric lines, showing wide interspaces, in the young, with radial lines of fringe more conspicuous later; beaks small, pointed, prominent for the size of the shell; area narrow, the black ligament short and central below the beaks; surface polished, with hardly any apparent sculpture, notwithstanding the periostracum is so conspicuously confined to certain lines; profile slightly oblique, nearly orbicular; hinge line straight, with four or five anterior and eight posterior teeth; interior of disk bluish white, smooth, with, close to the margin, a continuous series of minute tubercles; muscular scars distinct, the anterior very small and adjacent to the hinge plate, the other larger and more distant. Alt. of shell, 6.5; of beaks above the hinge line, 0.5; diam. 4.0 mm.

U. S. S. "Albatross," station 3360, Gulf of Panama, in 1672 fathoms, sand, bottom temperature 42° F. U. S. N. Mus. 122,891. Also from station 3418, off Acapulco, Mexico, in 660 fathoms, sand, temperature 39° F. U. S. N. Mus. 110,559.

Limopsis diazi Dall, n. sp.

Plate 18, figure 7.

Shell closely resembling in general appearance *L. juarezi* Dall, but thinner, smaller, the hinge with four anterior and four posterior teeth, the cavity of the valve deeper and the interior of the disk radiately finely sulcate with subequal, rib-like interspaces which reach and feebly crenulate the margin, which bears no tubercles. Alt. 4.2; lat. 4.5; diam. 2.5 mm.

U. S. S. "Albatross," station 3418, off Acapulco, Mexico, in 660 fathoms, sand, bottom temperature 39° F. U. S. N. Mus. 122,892.

Arcidae.

ARCA (Linné) Lamarck.

Scapharca Gray.

BATHYARCA Kobelt.

Bathyarca Kobelt, Martini-Chemnitz Conch. Cab., zweite ausg., 1891, Mon. *Arca*, p. 214; type, *Arca pectunculoides* Scacchi.

Arca (Bathyarca) nucleator Dall, n. sp.

Plate 18, figure 9.

Shell small, plump, subglobular, equivalve, inequilateral, white, with a dense villous periostracum; beaks full, prominent, adjacent, overhanging a long narrow amphidetic area; anterior part of the straight hinge line shorter than the posterior, each making an angle with the beginning of the valve margin which forms a slightly oblique subcircular arc, the posterior end being more rotund; sculpture very finely and subequally reticulate, the radial and concentric raised lines alike bearing long, furfuraceous fringes of periostracum; hinge line not quite as long as the shell, the anterior part carrying six radiating minute teeth, the posterior part eight, which are somewhat more nearly horizontal; interior of the valve smooth, whitish, margins entire. Alt. 6; lat. of shell, 6; of hinge line, 5; max. diam. 4 mm.

U. S. S. "Albatross," station, 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F. U. S. N. Mus. 122,876.

Quite similar to the variety *orbiculata* of the *Arca pectunculoides*, but less extended laterally, less oblique, and with a finer and more delicate sculpture.

Arca (Bathyarca corpulenta var. ?) pompholyx Dall.

Cf. *Arca* (*Barbatia*) *corpulenta* Smith, Challenger Rep., 1885, **13** (bivalves), p. 263, pl **17**, figs. 5-5b.

Smith's *Arca corpulenta* ranged from North Australia to Juan Fernandez Island, and on the west, northward to Celebes, in 200 to 2425 fathoms, thus covering part of the range of the present shell, which differs from Smith's very full and careful description of *A. corpulenta* in the following particulars: The beaks are larger, fuller, and more conspicuous; the sculpture is composed of narrow, flat, smooth, concentric bands much wider than the radiating lirae, which are only visible in the interspaces and do not nodulate the intersections; in comparing an umbonal view of the present shell with the figure in the Challenger Report, the beaks of the specimen are much nearer the anterior end of the hinge line than in the figure. These lead me to think that the two may be distinct, or at least distinguishable varieties, as the specimens I have seen show variations. The present shell measures 23.5 mm. long; 26 high; diameter 22; hinge line 16.5, with the beaks 4.5 mm. from the anterior end of the hinge line. The hinge in this specimen has seven anterior and five posterior teeth with an edentulous gap 10 mm. long between them, but another specimen of the same species has the entire hinge line denticulate. The stations are as follows:

Station.	Region.	Fathoms.	Bottom temp.	Character of bottom.
*4390	off California	2182	35°.0	mud
4396	" "	2228	35°.0	"
4709	Mid Pacific	2035	35°.3	ooze
4721	" "	2084	35°.0	"
4740	" "	2422	34°.2	"

*U. S. N. Mus. 110,704.

Barbatia Gray.

CUCULLARIA Conrad.

Cucullaria Conrad, Amer. Journ. Conch., 1869, **5** p. 97; type, *Arca heterodonta* Deshayes, Eocene.

I pointed out in 1898 that the forms included by Conrad in his genus Cucullaria were probably not closely related to Macrodon Lycett, to which their hinges bear a superficial similarity, and recently M. Cossmann has expressed the same opinion. There is a pretty gradual shading off from the Eocene type to that of the recent species, but the inequilateral shell, the V-shaped ligament, and the general aspect forbid us to refer these little species to the typical Barbatia, and it will therefore be convenient to retain Conrad's name.

Arca (Cucullaria) endemica Dall, n. sp.

Plate 17, figure 8.

Shell small, thin, brownish, inequilateral, equivalve, moderately inflated; beaks small, pointed, slightly prosogyrate, situated at about the anterior third, separated by a long, narrow, flat, lozenge-shaped area on which the ligament, which is wholly opisthodetic, forms a long, very acute V; surface dull, minutely concentrically imbricate, radiately sculptured with numerous close, very fine rounded threads which become wider and flatter distally; periostracum fibrous, dehiscent; anterior end attenuated, short, pointed; posterior end broad, rounded, compressed; a shallow radial constriction extending basally from the beaks; base oblique, with a narrow gape for the byssus at the extremity of the constriction; interior porcellanous, white, the scars evident; hinge rectilinear, anterior teeth six, vertical, separated by a gap from the narrow oblique series of eight posterior teeth; margin forming an angle at each end of the hinge plate. Lon. of shell, 11.5; of beaks behind the anterior end, 3.0; max alt., 7.0; diam., 4.5 mm.

U. S. S. "Albatross," station 4721, Pacific Ocean, in S. Lat. 8° 07′ and W. Lon. 104° 10′, in 2084 fathoms, globigerina ooze, bottom temperature about 35° F. U. S. N. Mus. 110,578. Also at station 4685, in S. Lat. 21° 36′ and W. Lon. 94° 56′, in 2205 fathoms, radiolarian ooze, bottom temperature 35°.3 F.

This is very close to *Arca* (*Cucullaria*) *pteroëssa* E. A. Smith, of the Mid North Pacific, but has a coarser radial sculpture and less numerous teeth.

GLYCYMERINAE.

GLYCYMERIS Da Costa.

Glycymeris Da Costa, Brit. Conch., 1778, p. 170; type, *Arca glycymeris* Linné.
Pectunculus Lamarck, Prodrome, 1799, p. 87; not of Da Costa *et al.*
Pseudaxinea Monterosato, Nota int. *Pectunculus* dei mari d'Europa, 1892; type, *P. violascens* Lamarck.

Glycymeris multicostatus Sowerby.

Pectunculus multicostatus Sowerby, P. Z. S. Lond., 1832, p. 195; Reeve, Conch. Icon., 1, *Pectunculus*, pl. 5, fig. 26.

Bay of Guayaquil, Cuming. U. S. S. "Albatross," station 3368, near Cocos Island, in 66 fathoms, rocky bottom, temperature 58°.4 F. U. S. N. Mus 122,877.

The single valve obtained as above has all the aspect of the specimens of G.

multicostatus in the collection, and many of them have about the same number of ribs, thirty-four, the maximum being about forty. On a close and careful inspection, however, certain differences appear, which lead to a doubt as to its identity.

The average specimens of *G. multicostatus* have the valves heavy, the scars marked by an elevated ridge, and almost always have more or less dark brown on the interior of the disk. The radiating costae are low, flat, and polished in most cases, not in any observed case sculptured, and the interspaces are narrow, shallow, and only crossed by incremental lines.

In the valve above mentioned the radial costae are elevated, their upper edges almost overhang the channels, and the upper surface is closely transversely threaded. The channels without exception are elegantly reticulated by concentric, regularly spaced, elevated lirae, about five to a millimeter. The interior of the shell is pure white, the adductor scars are very little raised; there are eleven anterior and thirteen posterior teeth forming a continuous arch on the hinge plate.

Whether these differences are merely individual, or whether we have to do with a species closely allied to but distinct from *G. multicostatus*, will require much more copious material to determine.

(C. Isodonta.)

Pectinacea.

Pectinidae.

PECTEN Müller, 1776.

Having seen somewhere a statement that the name *Pecten* was first used in a generic sense by Peter Osbeck, in his "Voyage to the East Indies and China," 1765, I took the trouble to hunt up the reference (p. 391, *op. cit.*), and found that Osbeck's name has no standing in systematic nomenclature, as no definition is given and no described species is referred to it. It is a *nomen nudum*, pure and simple. From the context it is evident that the name is used colloquially, as was long done by the pre-Linnean collectors, for Murices of the type of *Murex tenuispina* with a long canal having small spines at right angles to it, which among dealers and collectors was often called *pecten-veneris*, or Venus' comb. The first to use Pecten in the modern sense was Rumphius, in 1704, from whom it is probable Müller derived his generic name, and who preceded Osbeck by more than half a century.

PECTEN s. s.

Pecten sericeus Hinds.

Pecten sericeus Hinds, Zool. Voy. Sulphur, 1844, Moll., p. 60, pl. **17**, fig. 1.

Panama Bay, 53 fathoms, Hinds. U. S. S. "Albatross," station 3368, near Cocos Island, Gulf of Panama, in 66 fathoms, rocky bottom, temperature 58°.4 F. U. S. N. Mus. 122,864.

Both valves were originally covered with fine, concentric, umbonally inflected, concrescent lamellae, which are usually entirely cleaned off in cabinet specimens.

Chlamys Bolten.

NODIPECTEN Dall.

Pecten (Nodipecten) subnodosus Sowerby.

Pecten subnodosus Sowerby, P. Z. S. Lond., 1835, p. 109; Thes. Conch., 1843, Pecten, p. 65, pl. **15**, figs. 97, 112.

Gulf of Tehuantepec, in 10–17 fathoms, Sowerby; U. S. S. "Albatross," station 3368, near Cocos Island, in 66 fathoms, rocky bottom, temperature 58°.4 F. U. S. N. Mus. 122,863. Also Gulf of California.

PALLIUM Schumacher.

Pecten (Pallium) miser Dall, n. sp.

Plate 8, figure 6.

Shell small, flattish, dark reddish purple, with a narrow hinge line, striated disk and five strong radial ribs; anterior ear very short, oblique; posterior ear longer, triangular, with three radial threads near the hinge line, an excavated, concentrically striated space between them and the edge of the disk; right valve with five, strong, rounded ribs with subequal interspaces, and two much smaller, closer, and less prominent, near the anterior submargin, and a single, similar riblet near the posterior submargin; ctenolium rather long with about five free hooks; minor sculpture of the disk consisting of very numerous subequal radial threads with subequal interspaces crossed by still more numerous fine, imbricated, sharp lamellae which, when the surface is intact, coalesce, but when it is worn show as sharp concentric lamellae looped over sharp radial ridges with distinctly wider interspaces; distal margin of the valve suddenly and markedly contracted in the adult; hinge line with strong plicae on each side of the cartilage pit, strongly vertically striated; interior smooth, ridged by the sculpture, livid purple with strong lirations near the valve margin, on the lateral margins of each rib; valve margin minutely crenulate. Alt. 34.0; lat. of valve, 32.0; of hinge margin, 9.0; diameter of right valve, 6.0 mm.

U. S. S. "Albatross," station 3355, Gulf of Panama, in 182 fathoms, mud, bottom temperature 54°.1 F. U. S. N. Mus. 122,862.

Only two upper valves of this species were obtained, but as it belongs to a group totally distinct from any other on the Pacific Coast, so far known, it can be recognized without difficulty.

Pecten (Chalmys) pasca Dall, n. sp.

Shell (left valve) flat, irregular distally, rose-pink and white, irregularly clouded, somewhat inequilateral; anterior ear larger, with four crimson radial threads on a light pink background covered with the superficial reticulum; posterior ear smaller, with two or three radial obscure threads; disk with about fourteen radial ribs (none intercalary) subequal and equally spaced; the whole surface covered with a fine, closely woven reticulum of minute rectangular scales, when perfect coalescent at the surface, when the surface is eroded presenting a minute cellular reticulum, when this is eroded the surface still shows fine regular reticular markings. When the crust is perfect over a rib it appears keeled, when the crust is removed the rib itself is seen to be rounded, the interspaces also are not channelled but roundly excavated; interior polished, the coloration shining through; hinge margin straight, with a small medial pit, the margin showing conspicuous traces of the provincular striation; there are no crura, the peripheral margin of the disk is irregular. Alt. of valve, 16; lat. of valve, 13; of hinge line, 8 mm.

Collected on the beach at Easter Island, by the "Albatross" party. U. S. N. Mus. 110,765.

This single valve would perhaps not have been worthy of description were it not that it seems to belong to the group of species called Hinnites, and possesses such a remarkable surface. I have elsewhere expressed the opinion that the different species of Hinnites are more intimately related to various groups of Pecten than they are to each other, and that probably there is no direct genetic relation between the fossil species. The "genus" Hinnites may be regarded as composed of "sports" from the Chlamys group of Pecten.

Pseudamusium H. and A. Adams.

Pecten (Pseudamusium) liriope Dall, n. sp.

Shell small, fragile, whitish, subcircular; convex (left) valve with small subequal ears finely concentrically lamellose; disk with extremely fine, close, radial threads with nearly equal interspaces; crossed by fine, concentric lamellae, with wider interspaces, more distant on the beaks, closer toward the margin; interior glassy, the sculpture shining through; right valve similarly sculptured, except that the radial threads are obsolescent and the concentric lamellae more obvious; anterior ear longer with a wide byssal sulcus and fasciole, a single radial thread bordering the fasciole; margin of the disk flexible. Alt. 7.5; lat. 8.0; hinge line, 4.5; diam. 2.5 mm.

U. S. S. "Albatross," station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature, 36°.4 F. U. S. N. Mus. 122,869.

A peculiar thing about the sculpture of this little shell is that, looked at in one light, only the radial, in another only the concentric sculpture is visible, and thus there is no effect of reticulation to speak of, yet there is little difference in the strength of the two kinds of sculpture.

Pecten (Pseudamusium) neoceanicus Dall, n. sp.

Plate 9, figure 4.

Shell small, thin, brownish white, concentrically undulate and with both valves similarly reticulately sculptured, equivalve, somewhat equilateral; beaks (showing small, polished prodissoconch) small, pointed, the left one rising a little higher than the other; hinge line straight, ears subequal, sharply pointed, byssal notch and fasciole distinct, sculpture like that of the disk; surface of the valves with about four easy, wide, rounded undulations; surface sculptured with numerous fine, squarish, radial and concentric threads subequal and subequally distributed, so that the meshes are mostly square, without nodulation at the intersections, and the interspaces are wider than the threads; disk short, kite-shaped, a little produced in front, suddenly constricted at the margin; interior white, polished, the umbonal cavities extending under the hinge line; the pit and resilium small. Alt. 12.0; lat. of shell, 12.0; of hinge line, 7.7; diam. 4.0 mm.

U. S. S. "Albatross," station 4721, Pacific Ocean in South Lat. 8° 7′, and West Lon. 104° 10′, in 2084 fathoms, globigerina ooze, bottom temperature about 35° F. U. S. N. Mus. 110,579.

This is a most exquisite little gem of the sea.

Pecten (Pseudamusium) polyleptus Dall, n. sp.

Plate 10, figure 9.

Shell small, thin, translucent white, compressed, having a marked "*Camptonectes*" striation, beside about thirty-six radial rows of minute, elevated, granule-like scales, very easily detached and more crowded near the middle of the base; hinge line straight; anterior ear in the right valve long, prominent, with five radial rows of scales and obvious concentric striation; byssal notch deep and wide, with a broad fasciole, the ctenolium with three free teeth; posterior ear not differentiated by a notch; profile of the valve, below and behind, a segment of a circle; interior with glassy polish, scar small and high up, hardly visible; margins entire; ligamentary pit small, shallow. Alt. of valve, 9.5; lon. of valve, 9.5; of hinge line, 6.5; diam. of right valve, 1.2 mm.

U. S. S. "Albatross," station 4642, Galapagos Islands, four miles S., 41° E., from Ripple Point, Hood Island, in 300 fathoms, globigerina sand, bottom temperature 48°.6 F. U. S. N. Mus. 110,586.

Only the right valve was obtained at this station, but at station 2781, on the west coast of Patagonia, Southern Chile, in South Lat. 51° 52′, in 348 fathoms, mud, bottom temperature 50° F., a left valve which probably belongs to the same species was dredged by the "Albatross" in 1888. The sculpture is essentially similar, except that the scales are fewer and more distant from each other; only 34 rows could be counted, and the umbonal part of the valve shows several concentric undulations. The ears are large, subequal, the anterior larger with six radial rows of scales. The "*Camptonectes*" sculpture is conspicuous upon the glassy shell.

Pecten (Pseudamusium) gelatinosus Mabille et Rochebrune.

Pseudamusium gelatinosum M. et R, Miss. Cap Horn, Moll., 1889, 6, p. H 126.

Orange Harbor, Mabille; U. S. S. "Albatross," station 2785, in 449 fathoms. mud, temperature 47° F. U. S. N. Mus. 96,454.

This is the species which by some authors has been referred to *P. vitreus* Gmelin, from which it differs by sparser distribution of the scales and of the rows of scales, and by a slight but obvious obliquity. The two forms are, however, extremely similar. The "Challenger" dredged the present form in from 140 to 400 fathoms, off the southwest coast of Chile, or western Patagonia.

Pecten (Pseudamusium) panamensis Dall, n. sp.

Plate 6, figures 8, 10.

Shell translucent yellowish white, very thin, resembling mica in consistency, oblique, compressed; beaks small, low, polished, hardly projecting beyond the hinge line; ears small, subequal, the posterior feebly differentiated; the anterior right ear with a wide fasciole corresponding to the byssal sulcus, above which are five or more radial threads, the whole with strong incremental lines; on the lower margin of the fasciole is a line of minute beads, apparently a ctenolium which becomes obsolete at maturity; the other ears are sculptured like the rest of the disk; sculpture: on the left valve a feeble but distinct "*Camptonectes*" striation, rather coarse and irregular incremental lines, the whole crossed by 40–65 fine radial, sparsely, minutely scaly threads, the scales occurring usually at the intersection with a prominent incremental line; left valve with similar sculpture except that the "*Camptonectes*" striation is so fine as to require strong magnification and a good light to be seen at all; the valves are produced obliquely downward and backward; the surface sculpture yields readily to friction and many of the valves have lost it altogether, retaining only the concentric sculpture; left valve slightly more convex; interior glassy, the resiliary pit very small, the margins entire. Height, 18; length, 18; max. diam. 2.5; hinge line, 9.5 mm. A very large specimen is 22 mm. high.

U. S. S. "Albatross," station 3354, Gulf of Panama, in 322 fathoms, mud, bottom temperature 56° F. U. S. N. Mus. 122,865. Also at stations 3389, 3396, 3407, and 3422, ranging from near Acapulco, Mexico, to the Galapagos Islands, in 141 to 885 fathoms, soft bottom, temperatures 37°.2 to 53°.5 F.

The shell was very abundant at some localities, the valves dead and separated, very few retaining the radial sculpture.

CYCLOPECTEN Verrill.

Pecten (Cyclopecten) rotundus Dall, n. sp.

Shell very small, thin, white, suborbicular, with subequal ears, both valves nearly equally convex; right valve polished, minutely regularly concentrically striated, which sculpture is barely visible under a hand lens; posterior ear smooth, anterior finely radially threaded, with a narrow but clean-cut byssal sulcus and fasciole; left valve finely sharply radially striated, the anterior ear finely reticulated, the posterior apparently nearly smooth; hinge line short, straight; interior smooth, a pair of small auricular crura present; the hinge line with a minute central pit and two relatively large transversely sharply striated, elongate areas representing a permanent provinculum. Height and length, 3; hinge line, 2.5; diameter, 1.0 mm. A single valve from near the Straits of Magellan, apparently the same species, measures 7 mm. in height.

U. S. S. "Albatross," station 2799, in Panama Bay, in 29½ fathoms; also at station 2784, in 194 fathoms, mud, bottom temperature 51°.9 F. U. S. N. Mus. 110,708.

The hinge line of this species is very much like that of *P.* (*Pseudamusium*) ***thalassinus*** Dall, described in the "Blake" report.

Pecten (Cyclopecten) cocosensis Dall, n. sp.

Plate 6, figures 1, 3.

Shell small, suborbicular, translucent whitish, irregularly painted with opaque white, red, and ferruginous brown, in lines, zigzags, or clouded patches; there are also visible on the right valve in some of the specimens whitish rays which would give the impression until the interior is examined that the shell belongs to the Propeamusium group; ears subequal, small, the anterior larger, in the left valve elegantly minutely reticulated and at the hinge line adorned by a series of small, close-set, short, sharp spines; in the right valve the sculpture of the ears is very similar, but the lines are less close and sharp and the anterior auricle has a deep triangular byssal sulcus, without a noticeable fasciole or a ctenolium; left valve with the umbo sharp, small, and prominent, the disk nearly smooth, with faint radial striae which near the submargins become more regular and sharp, especially behind; right valve with a less prominent umbo, the surface polished, the ventral margin flexible, and reflexed when closed; sculpture of fine, close, regular concentric lines with wider flat interspaces; interior smooth, polished, without radial lirae; the hinge line with two well marked transversely striated provincular areas. Height of shell, 8.7; breadth, 9.0; hinge line, 5.0; diam. 2.0 mm.

U. S. S. "Albatross," station 3369, near Cocos Island, Gulf of Panama, in 52 fathoms, rocky bottom, temperature 62°.2 F. U. S. N. Mus. 122,870.

The faint white rays on the right valve of this shell look so much like Propeamusium that until I separated the valves of one of the specimens I had no doubt it belonged to that group.

AMUSIUM Bolten.

PROPEAMUSIUM De Gregorio.

Amusium (Propeamusium) malpelonium Dall, n. sp.

Plate 6, figure 9.

Shell suborbicular, of a dirty white color, very thin and fragile, with small subequal ears, moderately convex; beaks low, prodissoconch small, swollen, slightly irregular, often eroded; left valve with small subequal, minutely concentrically lamellose ears; posterior submargin smooth or only with incremental lines; disk with fine incremental lines crossed by numerous fine radial lines with wider interspaces, increasing by intercalation; these radii are arcuate, slightly convex on the anterior side, and bending gently toward the posterior; the radii are not scaly; right valve flexible toward the ventral margin, the portion beyond the internal lirae slightly reflexed when the valves are closed; ears similar and similarly sculptured, the anterior with no byssal sulcus, though there is a single feeble ray near the submargin and a slight inward flexuosity of the incremental lines; disk regularly concentrically striated, the striae with wider interspaces, the intact surface covered with a thin, dehiscent, coarsely fibrous layer; interior polished, the central part whiter, with nine regular, even white, elevated lirae extending all the way from the umbonal region without noticeable thickening distally; in each valve are also two short auricular crura. Height of shell, 18.2; breadth, 18.5; hinge line, 8.2; diam. 3.4 mm.

U. S. S. "Albatross," station 3360, Gulf of Panama, in 1672 fathoms, sand, bottom temperature 42° F. U. S. N. Mus. 122,871. Also abundantly, near Malpelo Island, at station 3374, in 1823 fathoms, ooze, temperature 36°.4; 3381, in 1772 fathoms, mud, temperature 35°.8; 3361, in 1471 fathoms, ooze, temperaure 36°.6; and 3684, in Mid Pacific, latitude 0° 50′ N., longitude 137° 54′ W., in 2463 fathoms, ooze, temperature about 35° F.

This is an abundant but not particularly attractive abyssal species, sufficiently distinct from any of the Atlantic species.

Spondylidae.

PLICATULA Lamarck.

Plicatula dubia Sowerby.

Plicatula dubia Sowerby, Thes. Conch., 1847, **1**, p. 436, pl. **91** (only), fig. 19.

U. S. S. "Albatross," station 2798, in Panama Bay, in 18 fathoms; U. S. N Mus. 96,262. Cana Island, West Columbia, Cuming.

Limidae.

LIMA Cuvier.

Lima s. s.

Lima s. s. Dall, Trans. Wagner Inst., 1898, **3**, p. 765; type *ostrea lima* Linné.

MANTELLUM Adams.

Lima (Mantellum) hians Gmelin.

Ostrea hians Gmelin, Syst. Nat., 1791, **1**, pt. 6, p. 3332, no. 97.
Lima hians Hanley, Rec. Shells, 1843, p. 268, footnote.

Lima fragilis (*pars*), Sowerby, Thes. Conch., 1847, **1**, p. 86, No. 14; pl. **22**, fig. 34 (only).

U. S. S. "Albatross," at the Galapagos Islands. Panama, Cuming; Acapulco, Dall. U. S. N. Mus. 106,884.

The nomenclature of the Limas is much mixed up, and the range of the species is very great. *L. dehiscens* Conrad, 1838, is a good species, quite distinct, as Limas go, from *L. fragilis.*

L. angulata Sowerby was collected by me at Acapulco, Mexico, though described from Australia. I cannot distinguish the Galapagos shell from North European specimens.

Acesta H. AND A. ADAMS.

Lima (Acesta) patagonica DALL.

Lima (*Acesta*) *patagonica* Dall, Nautilus, June, 1902, **16**, p. 16.

U. S. S. "Albatross," station 2781, southern Chile, on the west coast of Patagonia, in 348 fathoms, mud, bottom temperature 50° F. U. S. N. Mus. 95,462, 96,453, 96,931, 96,927, and 122,734. Also at station 2785, in 449 fathoms, mud, temperature 47°.

This has been called *L. excavata* variety, and also referred to as a variety, of the Japanese *L. goliath* Sowerby. The young shells are beautiful little polished translucent objects, with well-developed teeth on the hinge line, the formula being $\frac{R\ 101\ \ L\ 101}{L\ 010\ \ L\ 010}$. These teeth become obsolete or nearly so in the mature shells.

Lima (Acesta) agassizii DALL.

Plate 16, figure 1.

Lima (*Acesta*) *agassizii* Dall, Nautilus, June, 1902, **16**, p. 16.

U. S. S. "Albatross," station 3354, in the Gulf of Panama, in 322 fathoms, mud, bottom temperature 46° F. U. S. N. Mus. 106,890.

Only one valve of this species was obtained.

Lima (Acesta) diomedae DALL, n. sp.

Plate 7, figure 2.

Shell short-ovate, of moderate size, white, with a pale yellowish periostracum, equivalve, inequilateral, radiately sculptured, polished; hinge line very short, straight, with a very oblique ligamental pit in the narrow, triangular, flattened area; beaks very low, hardly rising above the area, situated opposite the posterior end of the hinge line, behind them a long, narrow, faintly radially striated, excavated escutcheon; anterior slope very short, straight; posterior long, oblique, slightly excavated; remainder of the valve margins evenly, ovately arcuate; disk sculptured with about fifty flat, polished, radial ribs with narrow, channelled interspaces, each about one third the width of the intervening ribs; concentric sculpture only of faint, incremental lines, and three or four lines indicating resting stages; interior polished, white, the margins slightly notched by the external sculpture but not internally crenulate; muscular scars rounded, faint, rather small; hinge with a single obsolete tubercle in each valve at each end; the valves do not gape perceptibly, except a narrow chink in the middle of the escutcheon. Alt. 35; lat. 32; diam. 14; hinge line, 11; posterior slope, 16 mm.

U. S. S. "Albatross," station 3404, near the Galapagos Islands, in 385 fathoms, rocky bottom, temperature 43°.2 F. U. S. N. Mus. 122,875.

Although a small shell when compared with such giants as *L. excavata*, the characteristics are such as to place it in the same section of the genus. It differs from the young of either of the large species, so far as known, by its short and broad shape, thick and heavy shell, and strong, radial sculpture.

Lima (Limatula) similaris Dall, n. sp.

This little shell appears, on a casual glance, exactly like *Limatula subauriculata* Montagu, but a careful comparison of specimens of the same size shows the following differences: the hinge line is slightly shorter, the auricular angles less prominent, and the area between the beaks less wide, the socket for the ligament consequently is shorter and more feeble; the surface is covered with radial threads which cover most of the disk instead of being strong only near the ventral margin; there is no radiating medial sulcus, so prominent in *L. subauriculata*, either within or without the shell, and the slight obliquity or lateral deviation of the ribs is in the opposite direction from that in *L. subauriculata*. Length of shell, 4.5; width, 2.7; diam. 2.0 mm.

U. S. S. "Albatross," station 2799, in 30 fathoms, mud, Panama Bay. U. S. N. Mus. 109,034.

Only one valve of this little shell was obtained, and that was unfortunately crushed by accident after the above diagnosis had been prepared. A second specimen, somewhat smaller, was obtained at 2983, in fifty-eight fathoms, sand, off Cerros Island, Lower California, bottom temperature 55° F. In this a slight trace of a mesial furrow between two small threads appears on the inside of the shell, but none on the external surface.

Lima (Limatula) pygmaea Philippi.

Lima pygmaea Philippi, Arch. für Naturg., 1841, **1**, p. 56.

Lima (Limatula) pygmaea (ex parte) E. A. Smith, Phil. Trans., 1870, **168**, p. 191. Zool. Kerguelen Id. (Moll., p. 25), pl. **10**, fig. 16.

Lima martiali Mabille et Rochebrune, Miss. du Cap Horn, Moll., 1889, p. II. 124; Orange Harbor.
Lima (*Limatula*) *pygmaea* Smith, Chall. Rep., Lamell., 1885, p. 292.

U. S. S. "Albatross," station 2777, Magellan Straits, in 20 fathoms, gravel; U. S. N. Mus. 96,192; also at station 2778, in 61 fathoms, bottom temperature 47°.9 F. Kerguelen Island, Smith; South Orkneys, Scottish Antarctic Expedition?

From the material available it seems that there are two species of Limatula in the Magellanic region, one of which was described as above indicated, by Philippi, as having smooth radial ribs and the submargins without radial sculpture.

One form, which I identify as *pygmaea*, has the smooth submargins large, and extending nearly to the ventral border, without any radial sculpture upon them whatever, and with the concentric sculpture of the disk confined to incremental lines. The number of ribs visible at the ventral margin does not exceed fifteen. In neither of the species is there any medial sulcus. The very young show a distinct though minute taxodont provinculum, but the adult does not show the hinge denticulations of *Limaea;* although the general form and sculpture recalls *Limaea* rather than the Limatula of the Northern hemisphere.

Lima (Limatula) falklandica A. ADAMS.

Limatula falklandica A. Adams, P. Z. S. Lond., 1863, p. 509.
? *Lima* (*Limatula*) *hodgsoni* E. A. Smith, Nat. Antarct. Exp., Nat. Hist., 1907, **2**, Moll., p. 6, pl. **3**, fig. 8.

U. S. S. "Albatross," station 2781, off the coast of Southern Chile, or Western Patagonia, in 348 fathoms, mud, bottom temperature 49°.9 F. U. S. N. Mus. 96,930. Also at stations 2783, 2784, and 2787, in 61 to 194 fathoms, mud, temperatures 48° to 54° F. Falkland Islands, A. Adams; South Orkneys, Scottish Antarctic Expedition.

This species, of which a good many specimens were collected, differs from *L. pygmaea* Philippi, by having short and very small, smooth submargins, and in having the radial ribs smaller, much more numerous, and obscurely divided into three areas; the median with about fifteen strong ribs; an anterior with about eleven gradually much smaller ribs; and a posterior with about fourteen similar ribs, gradually becoming obscure. All these ribs are elegantly sculptured by small concentric, regularly spaced lamellae, which in crossing the ribs rise to small vaulted scales exactly as figured by Smith for *L. hodgsoni*, as above cited (fig. 8b). In some cases the scales are closer than in others, but this seemed the only material variation. I am not sure that *L. hodgsoni* is specifically identical with *L. falklandica*, since the former is more than twice as large as the latter, but the beautiful figure of the former given by Smith seems identical in every other respect with our shells. I separate *falklandica* from *pygmaea* + *martiali*, because A. Adams especially mentions the concentric sculpture, while Philippi and Mabille declare their shells to have "smooth" ribs.

Limia (Limatula) suteri Dall, n. sp.

Shell of about the size and form of *L. subauriculata*, with fine concentric incremental lines and feeble radial riblets, discrepant on the two valves, slightly deflected backward distally; both valves with a well-defined median sulcus, which on the interior of the valve is bordered on each side by a single distinct rib; right valve externally has one rib in front of the sulcus and seven to nine behind it; left valve with seven or eight ribs on each side of the sulcus; the ends of the ribs serrate the ventral margin; beaks small, prominent; hinge line subequally divided, the auricular angles prominent; the amphidetic area narrow; the resiliary pit wide and short; color white or pale brownish. Length, 7.1; breadth, 4.5; diameter, 3.5 mm.

Stewart Island, New Zealand, in 18 fathoms, H. Suter. U. S. N. Mus. 195,290.

These little shells were sent to the Museum some time since by Mr. Suter, in whose honor they are named, and in working out the "Albatross" species were determined to be new.

Mytilacea.

Mytilidae.

CRENELLA Brown.

Crenella divaricata Orbigny.

Nuculocardia divaricata Orbigny, Moll. Cubana, 1847, **2**, p. 311, pl. **27**, figs. 56–59.
Crenella divaricata Dall, Trans. Wagner Inst. Sci., 1898, **3**, p. 803.

On the Atlantic Coast this shell ranges from North Carolina to Barbados, and in time from the Oligocene of Santo Domingo to the recent fauna. On the Pacific it has been dredged by the "Albatross" in the Gulf of California and in Panama Bay, at station 2799, in 30 fathoms, and station 2805, in 51 fathoms, muddy bottom.

Crenella megas Dall.

Crenella megas Dall, Proc. U. S. Nat. Mus., 1902, **24**, p. 559; 1903, **26**, p. 950, pl. **62**, fig. 4.

Dredged by U. S. S. "Albatross," at station 2795, Panama Bay, in 33 fathoms, sand, one valve, bottom temperature 64° F. U. S. N. Mus. 96,256.

This is probably the largest species of the genus.

TELEODESMACEA.

(DIOGENODONTA).

Astartacea.

Astartidae.

ASTARTE Sowerby.

Astarte longirostra Orbigny.

Falkland Islands, Orbigny, Straits of Magellan, U. S. S. "Albatross," at station 2778, in 61 fathoms, bottom temperature 48° F. U. S. N. Mus. 110, 711. Elsewhere in depths as little as 20 fathoms, but rare apparently everywhere. The variations of this shell are considerable. Orbigny figured one with exceptionally long umbones, and the more common mutation with shorter beaks has received the name of *A. magellanica* from E. A. Smith.

Cyrenacea.

CORNEOCYCLAS Ferussac.

Corneocyclas Ferussac, *ex parte*, Dict. Sci. Nat., 1818, **12**, p. 278; Dall, Trans. Wagner Inst. Sci., 1903, **3**, p. 1459.
Pisidium C. Pfeiffer, Naturg. Conch., 1821, **1**, p. 123.

Corneocyclas magellanicus Dall, n. sp.

Shell small, whitish, with an olivaceous smooth periostracum, low, wide beaks, and polished surface with faint concentric indications of three or four resting stages; form inequilateral, anterior end shorter, bluntly subtruncate; base evenly rounded; posterior end slightly attenuated and rounded; external sculpture of faint incremental lines, chiefly obsolete between the resting stages; interior smooth, white; hinge of right valve with a single feeble horizontal tooth directly under the beak, and two well-developed lateral teeth rather distant from the beak, the posterior lateral stronger. Length of shell, 3.5; of posterior end of shell, 1.8; height, 2.5; diameter (of both valves), 2.0 mm.

U. S. S. "Albatross," station 2778, in Magellan Straits, in 61 fathoms; one right valve.

A single right valve, evidently washed into the sea from some stream, was obtained as above. As no species of this genus has been reported from this region I have thought it best to put it on record. The beak is not in any way differentiated or set off from the general surface of the shell.

Carditacea.

Carditidae.

VENERICARDIA Lamarck.

CYCLOCARDIA Conrad.

Venericardia (Cyclocardia) velutina Smith.

Cardita (Actinobolus) velutinus Smith, P. Z. S. Lond , 1881, p. 42, pl. **5**, fig. 8.
Venericardia (Cyclocardia) velutina Dall, Proc. Acad. Nat. Sci. Phila., Jan., 1903, p. 708.

U. S. S. "Albatross," station 2780, Magellan Strait, in 369 fathoms, mud, temperature 47° F. U. S. N. Mus. 96,239. Also at various localities on the west coast of Southern Chile and in the straits in 17 to 77 fathoms, rather common.

CARDITA (Bruguière) Lamarck.

GLANS Megerle.

Cardita (Glans) sulcosa Dall.

Plate 6, figure 2.

Cardita (Glans) sulcosa Dall, Proc. Acad. Nat. Sci. Phila., 1903, pp. 707, 715.

U. S. S. "Albatross," station 2798, in Panama Bay, in 18 to 30 fathoms. U. S. N. Mus. 96,278. Also at station 2799 in 29½ fathoms.

A small quadrate species, with a deep sulcus in the posterior margin, and variegated color pattern of dark brown, red-brown, and white.

Leptonacea.

Kelliellidae.

ALIGENA H. C. Lea.

Aligena H. C. Lea, Trans. Amer. Phil. Soc., 1845, ser. 2, **9**, p. 238; type, *A. striata* Lea, *op. cit.*, pl. **34**, fig. 13; Dall, Trans. Wagner Inst. Sci., 1900, **3**, p. 1175.

This genus in the eastern United States extends from the later Oligocene to the recent fauna. Spaniodon Reuss, 1867, from the Miocene of Galicia, should be compared with Aligena.

Aligena borniana Dall, n. sp.

Plate 10, figure 2.

Shell small, thin, white, subquadrate with a slight mesial contraction, the periostracum pale straw color, silky, microscopically concentrically closely striate; beaks low, posterior, prodissoconch distinct, minute, rounded; subsequent surface minutely concentrically sculptured; anterior end longer, wider, evenly rounded; posterior shorter, more rapidly descending and blunter; base nearly straight with a slight mesial inward curve; surface of the disk marked with minute, hardly visible, vermiculate, radial markings; interior, milk-white porcellanous, scars hardly visible; hinge edentulous, hinge line discontinuous below the beak, with a short, delicate, yellow-brown, narrow resilium, wholly internal. Lon. 14.2; of beak behind anterior end, 8.5; alt. 10.5; diam. 7.0 mm.

U. S. S. "Albatross," station 4732, Pacific Ocean, in South lat. 16° 32′, and West long. 119° 59′ in 2012 fathoms, globigerina ooze, bottom temperature 34°.8 F. U. S. N. Mus. 110,585.

This shell has very much the form of Bornia, but the hinge of Aligena. It is clearly distinct from any species of the group yet described.

Aligena pisum Dall, n. sp.

Shell very small, smooth, with a prominent, narrow, slightly prosogyrate umbo; valves suborbicular, feebly incrementally striated, covered with a pale periostracum which has a certain pearly lustre; there is no escutcheon or lunule, the margin is smooth and entire; ligament internal, opisthodetic, rather long; hinge line infolded under the beak with, in the left valve, a single obscure tooth or nodular prominence; pallial line entire. Length of shell, 2.5; alt. 2.7; diam. about 1.5 mm.

U. S. S. "Albatross," station 2778, Magellan Strait, in 61 fathoms, mud, bottom temperature 48° F. U. S. N. Mus. 110,715.

A single left valve of this minute species was obtained.

Leptonidae.

ROCHEFORTIA Vélain.

(*Tellimya* H. and A. Adams and Carpenter, *Mysella* Angas, not *Tellimya* Brown, 1827.)

Rochefortia mabillei Dall, n. sp.

Shell small, smooth, inequilateral, oblique, rather inflated; surface with faint lines of growth and obscure indications of one or two resting stages; the anterior end short and roundly pointed; the posterior longer, obliquely produced, rounded; resilium subumbonal, short, internal, left valve with two strong divaricating cardinal lamellae, one on each side of the resilium, rather short and prominent; right valve with the margins so produced as to enclose the opposite pair; interior of valve polished, with a yellowish flush; margins entire and also the pallial line. Longest dimension, 2.2; width at right angles, 1.7; diameter, 1.4 mm.

Dredged with the preceding species in Magellan Strait. U. S. N. Mus. 110,714.

A small but rather solid and characteristic little species. It is named in honor of the senior author of the Mollusks of Cape Horn.

Rochefortia rochebrunei Dall, n. sp.

Plate 17, figure 5.

Shell small, subquadrate, compressed, white, inequilateral, with low, rather anterior beaks, and a pale yellowish periostracum; anterior dorsal margin straight, sloping, anterior end rounded, basal margin nearly straight; posterior dorsal margin slightly convexly arcuate, near the end obliquely descending to a rounded point; outer surface somewhat irregularly concentrically striated; interior polished; resilium subumbonal, internal, with on each side of it a diverging lamella, stronger in the left valve. Length, about 4.5; height, 3.7; anterior end, 1.5; diam. 1.5 mm.

Dredged in Magellan Straits with the two preceding species. U. S. N. Mus. 110,713.

This species is named in honor of the junior author of the Mollusks of Cape Horn.

(Cyclodonta)

Cardiacea.

Cardiidae.

PROTOCARDIA Beyrich.

This genus, of Mesozoic origin, is not sparsely represented in the recent fauna of the deep sea, and some of the most lovely of molluscan gems of the ocean are found among these species. But the extremely fragile spinose ornamentation of the posterior area is almost always wanting, as a touch is enough to detach it even from the living shell.

Protocardia panamensis Dall, n. sp.

Plate 18, figure 1.

Shell small, very pale brown or dirty cream color, equivalve, subequilateral, plump, with elevated subprosocoelous beaks and a narrow thin ligament; sculpture, except on the posterior area, of small, flat, subequal radial ribs with narrower channelled interspaces crossed by numerous small, equal, and equally spaced concentric lamellae which do not rise above the ribs and are confined to the interspaces; on the average there are about thirty-three of the ribs with a smooth cordate lunular space in front of the beaks; the posterior area begins with a rib bearing minute spinules which are usually lost, leaving merely traces of their presence, behind this 21–23 similar ribs, narrower and slightly more elevated than those on the disk, with wider interspaces crossed by thinner and sharper concentric lamellae than on the disk; three or four of these interspaces instead of lamellae have minute, widely spaced spinules easily and usually lost, at the rate of about one spinule to four lamellae; these rows of spinules are not uniformly distributed on different individuals; a broad, smooth swollen fold borders the posterior hinge line; hinge normal, strong; interior polished, whitish; margin sharply serrate by the sculpture; the posterior area covers about one-fourth of the disk. Lon. 13.5; alt. 13.5; diam. 9.0 mm.

U. S. S. "Albatross," station 3355, Gulf of Panama, in 182 fathoms, mud, bottom temperature 54°.1 F. U. S. N. Mus. 122,928.

A rather simple and uninteresting little species with no particularly salient characters.

Isocardiacea.

Vesicomyacidae.

VESICOMYA Dall.

? *Callocardia* (A. Adams, 1864) E. A. Smith, Chall. Rep., Lam., 1885, p. 157.
Vesicomya Dall, Bull. Mus. Comp. Zoöl., 1886, **12**, p. 272; 1889, **18**, p. 439. Type, *Callocardia* (?) *atlantica* Smith, *op. cit.*, pl. **6**, fig. 8.
Callocardia (subgenus *Vesicomya*) Dall, Proc. U. S. Nat. Mus., 1895, **17**, p. 693; 1896, **18**, p. 17.

The unusual character of the gill-filaments in this genus, as displayed in *V. stearnsii*, rendered it necessary to separate it from association with the Isocardiacea, and an investigation into the nomenclature of Callocardia Adams showed that the type really belongs to the Veneridae. The subgenus of 1889 was elevated to the rank of a genus in 1895 (Trans. Wagner Inst., **3**, p. 551) under the name of Callocardia, though the true relations of Vesicomya were still regarded as doubtful. Finally further study and more material showed the relationship of the original Vesicomya and the so-called Callocardia, rendering it necessary to unite them under the former name, while the genus of Veneridae was relegated to its proper family.

The shells of this family appear to be rather characteristic of the abysses, but unfortunately very few specimens of the larger forms have yet been obtained in the living state, and it is not yet certain that all the species belong to a single genus. In the typical forms the pallial line, while entire, joins the posterior adductor scar proximally, so that there is a small triangular space below the scar which in most unsinuate bivalves would have been included in the area surrounded by the pallial line.

Vesicomya lepta Dall.

Plate 18, figures 13, 14.

Callocardia lepta Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 17.

Shell large, thin, earthy, white, compressed, with an olivaceous or yellowish, dehiscent epidermis, with concentric wrinkles and projecting laminae, which in the young are somewhat regularly spaced and distant, in the adult crowded and irregular; beaks small, low, not conspicuous, moderately inflated; valves evenly arcuate below, rounded at both extremities, the anterior shorter and less high than the posterior; lunule narrow, long, bounded by an incised line; ligament external, long, set in a groove, with the escutcheon narrow, its edges elevated above the dorsal margins of the valves and obtusely keeled, extending backward one half longer than the length of the ligament; interior smooth, or slightly radially striate, margins flattish, smooth; anterior adductor scar narrow, posterior wider, the pallial line joining it in front of its posterior edge, producing an indentation, though not a sinus, of the pallial line; hinge narrow; teeth small, compressed, three (more or less obscure) in each valve; in the right a long, strong anterior lamella, extending most of the way between the umbo and the adductor scar, with a socket around its posterior end; above this a short, small, thin lamina, joined around the socket with a thicker lamina, obscurely wavy and extended backward; in the left valve a stout subtriangular central, joined to a thin, short, anterior lamina, with a socket under it; a short, obscure, radial tooth behind the central one; no lateral teeth in either valve, and the cardinals, as usual in this group, somewhat variable, obscure, or ill-defined. Height of shell, 40; length, 58; diam. 23 mm.; the vertical of the beaks 17 mm. behind the anterior end of the shell.

U. S. S. "Albatross," station 3009, in the Gulf of California, off Concepcion Bay, in 857 fathoms, mud, temperature 38° F. U. S. N. Mus. 126,751. Also specimens from station 3346, off Tillamook, Oregon, in 786 fathoms, mud, temperature 37°.3 F.

This large, rather compressed species has somewhat the outline of the Indo-Pacific Paphia. The specimen figured was immature, but the magnified figure exactly represents the larger adult shell.

Vesicomya ovalis Dall.

Callocardia ovalis Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 18.

Shell resembling the *V. lepta* Dall, but smaller, more oval, the posterior dorsal border more arched, the proportional inflation greater, the lunule wider, the ligament proportionally and actually longer, the epidermis more adherent and without projecting fringes or lamellae; internally the teeth are smaller and more feeble, and the pallial line recedes less at the posterior adductor scar. Height, 26; length, 36; diam. 16 mm.; the vertical of the beaks 8 mm. behind the anterior end of the shell.

U. S. S. "Albatross," station 3360, in the Gulf of Panama, in 1672 fathoms, sand; temperature 36°.4 F. U. S. N. Mus. 106,898.

Vesicomya donacia Dall, n. sp.

Plate 17, figures 9, 13.

Shell swollen, cuneate, inequilateral, chalky white, covered with a pale olivaceous periostracum, finely concentrically striated; beaks high, inflated, markedly prosocoelous with a broadly cordate lunular space circumscribed by a strongly impressed line; ligament long, black, on a thin lamellar nymph; anterior end rounded, attenuated, short; posterior end longer, attenuated, slightly arcuate and obscurely rostrate; hinge line and base subequally arcuate; hinge in the left valve with two undifferentiated cardinal teeth almost parallel with the hinge line above them, from which they are separated by a shallow, widely V-shaped socket for the tooth of the right valve; under the nymph, and of about equal length, the hinge line shows an elongated narrow ridge, simulating a pseudolateral tooth; interior dull white, yellowish in the middle of the disk; margins and pallial line entire; the muscular scars distinct. Lon. 22; alt. 16.5; semi-diameter (left valve), 7.0 mm.

U. S. S. "Albatross," station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F. U. S. N. Mus. 122,929.

Only one left valve was obtained, but the form is sufficiently unlike the other species to be readily recognizable.

Vesicomya stearnsii Dall.

Callocardia stearnsii Dall, Proc. U. S. Nat Mus., 1895, **17**, p. 693, figs. 1A, 1B; 1896, **18**, p. 17.

U. S. S. "Albatross," station 3346, off Tillamook, Oregon, in 786 fathoms, mud, bottom temperature 37°.3 F. Also at station 3010, Gulf of California, in 1005 fathoms, mud, temperature 37°.6 F.

The species has much resemblance to *V. venusta* Dall, from the Atlantic, but is larger, less inflated, the anterior end higher, the base more rounded, the posterior end more angular and proportionally longer.

The preceding species are all of a generally suboval form with convexly arcuate base, and with the hinge teeth compressed dorsoventrally, so as to seem almost parallel with the hinge plate. A single enormous form, known as yet only by dead valves, differs so much from the others, not only in size but general aspect, while retaining essentially all the fundamental characters of the genus, that it seems best to give it a sectional name to itself.

ARCHIVESICA Dall, nov.

Shell inflatedly modioliform, mesially slightly constricted, with the hinge plate short and broad and the hinge teeth radially disposed; lunule not circumscribed by an impressed line; pallial line without a sinus, but descending nearly vertically from the middle of the posterior adductor scar. Type, *Vesicomya gigas* Dall, Gulf of California.

Vesicomya (archivesica) gigas Dall.

Plate 16, figure 9.

Callocardia gigas Dall, Proc. U. S. Nat. Mus., 1896, **18**, no. 1034, p. 18.

Shell large, rather thin, inflated, with a thin, wrinkled, olivaceous epidermis over an earthy, concentrically, irregularly striated surface; beaks low, inconspicuous; lunule and escutcheon somewhat impressed, but not limited by any distinct line; valves elongated, recalling the shape of *Modiola capax* Conrad, in a general way; the anterior side shorter and less high, the base impressed in the middle, more expanded in front and behind; dorsal margin rather evenly arched: both ends rounded; internally dentition strong, like that of *C. lepta*, but more distinctly developed; ligament short (about 20 mm.), set in a groove; interior of valve somewhat radially striate; posterior adductor scar somewhat larger, the pallial line set in below it, somewhat irregular but not forming a distinct angular sinus; margins of valve thin, smooth. Height, 63; length, 110; diam. 50 mm.; vertical of the beaks, 24 mm. behind the anterior end of the shell.

U. S. S. "Albatross," station 3009, off Concepcion Bay, in the Gulf of California, in 857 fathoms, mud, temperature 38° F. U. S. N. Mus. 110,557.

This relatively enormous shell was obtained only as a number of fresh valves without the soft parts, but from the shell characters it can hardly be anything but a giant Vesicomya.

Callogonia Dall.

Callogonia Dall, Bull Mus. Comp. Zool., 1889, **18**, p. 440; type, *C. leeana* Dall, *l. c.*, from off Tobago, West Indies, in 880 fathoms. Proc. U. S. Nat. Mus., 1896, **18**, p. 19.

This group differs from the typical Vesicomya chiefly by the possession of a distinct angular pallial sinus. The hinge and other characters in essentials are the same, but we may suppose, in the absence of any positive knowledge of the animal, that this indicates longer siphons than in such species as *V. stearnsii*, where they are known to be complete and papillose, longer than in Isocardia, but still quite short.

Vesicomya (Callogonia) angulata Dall.

Plate 6, figure 12.

Callogonia angulata Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 19.

Shell elongate, moderately inflated, the surface as in the other species; the anterior end rounded, shorter; the posterior end produced, pointed; ligament short, set in a groove; the posterior dorsal border marked by two obscure ridges radiating from the beak, the outer one of which terminates at the posterior extreme of the valve, angulating the margin; the epidermis is denser and lamellose in the interspaces between these ridges; lunule obscure; basal margin nearly straight, rounded up toward the ends; beaks low, anterior; interior white, with some radial striae; hinge narrow; right valve with two low cardinals coalescent above, and a third, higher, springing between them; pallial line distinct, with an angular, rather short sinus. Height, 35; length, 58; semidiameter, 10 mm.; the vertical of the beaks, 18 mm. behind the posterior end of the shell.

U. S. S. "Albatross," station 3392, in the Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4. U. S. N. Mus. 122,933. Also (fragments) at station 3360, in 1672 fathoms, sand, temperature 36°.4 F.

A single right valve of this distinct species was collected as above, and differs from Vesicomya especially by its angular pallial sinus.

(Teleodonta)

Tellinacea.

Tellinidae.

TELLINA (L.) Lamarck.

Arcopagia Leach.

PHYLLODINA Dall.

Tellina (Phyllodina) fluctigera Dall, n. sp.

Shell solid, elongate-ovate, nearly equilateral, of a yellowish white color; beaks low and flattish; anterior dorsal slope gentle, straight; anterior end rounded, base gently and evenly arcuate; in the left valve a long, narrow, and deeply impressed lunule; posterior dorsal slope convexly arcuate, near the posterior end obliquely truncate, bluntly pointed below; a long, narrow ligament on a well-developed nymph lies in the furrow of a narrow, excavated escutcheon, twice as long as the ligament; disk polished, sculptured with numerous (about two to a millimeter), elevated, regularly spaced concentric lamellae, which are flattened down near the middle of the disk but more erect and crowded toward the ends of the shell; in the left valve a shallow channel extends from the umbo to the posterior basal angle of the shell; above the channel is a faint ridge, beyond which the concentric lamellae, near the dorsal margin, break up into short waves or segments which become more distant and elevated at the verge of the escutcheon; interior polished, hinge line narrow, with three small cardinals, of which the anterior pair are closely adjacent; the margin under the lunule with a projecting angle distally; pallial sinus obliquely ascending, large, subangular, extending in front of the beaks on a level with the anterior adductor scar, entirely free from the pallial line below. Lon. of shell, 32; of part behind the beaks, 19; alt. 20; diam. of left valve, 4.5 mm.

U. S. S. "Albatross," station 3355, in the Gulf of Panama, in 182 fathoms, mud, bottom temperature 54°.1 F. U. S. N. Mus. 122,935.

The only other species of this group known from the region is *T.* (*P.*) *pristiphora* Dall, which cannot be confounded with the present shell, of which, unfortunately, only one left valve was obtained.

Moerella Fischer.

(*Moera* Adams, not of Leach; *Maera* Adams, not of Leach; *Donacilla* Gray, not of Lamarck.)

Tellina (Moerella) chrysogona Dall, n. sp.

Plate 10, figures 4, 8.

Shell small, solid, subtriangular, equivalve, inequilateral, polished, bright yellow fading into white about the margins; beaks smooth, pointed, rather small, with a strong opisthodetic external ligament; about a third of the disk near the beaks smooth, the remainder gradually developing regular, concentric, gradually more adjacent incised lines, and flattish interspaces, which on the posterior dorsal area are close-set, more elevated and conspicuous; anterior slope arcuate, longer, posterior shorter, more direct; anterior end broadly rounded, posterior bluntly pointed and bent to the right; base evenly arcuate; interior smooth, the centre of the disk an intense yellow; scars distinct, pallial line coincident with the lower half of the sinus, the bight of the sinus almost reaching the anterior adductor scar in both valves; hinge normal, two strong laterals in the right valve. Lon. of shell, 13; of beaks behind the anterior end, 5; alt. 10; diam. 5 mm.

U. S. S. "Albatross," station 4642, Galapagos Islands, four miles S. 41° E. from Ripple Point, Hood Island, in 300 fathoms, broken shell, bottom temperature 48°.6 F. U. S. N. Mus. 110,581.

This very distinct little species has an unusually lively color for a shell from such a depth.

Angulus MEGERLE.

Tellina (Angulus) carpenteri DALL.

Tellina (*Angulus*) *variegata* Carpenter, 1864, not *Tellina* (*Angulus*) *variegata* Gmelin, 1791.

Tellina (*Angulus*) *carpenteri* Dall, Proc. U. S. Nat. Mus., 1900, **23**, p. 303.

U. S. S. "Albatross," station 3355, Gulf of Panama, in 182 fathoms, mud, bottom temperature, 54°.1 F. U. S. N. Mus. 122,934.

It was most unexpected to find this species, common in shallow water on the coast of California, so far south, but it must be observed that the temperature of the water at the depth stated above, in 182 fathoms, is almost exactly that of the shallow waters of Alta California. Though only a single valve was obtained, the identity of the Panama specimen is not doubtful.

MACOMA LEACH.

Macoma inornata HANLEY.

Tellina inornata Hanley, P. Z. S. London, 1844, p. 144; Thes. Conch., 1847, **1**, *Tellina*, p. 315, pl. **59**, fig. 123. (Not *Tellina inornata* Hupé in Gay, Hist. de Chile, 1854, **8**, p. 356, pl. **8**, fig. 2)

Tomé, Chile, brought up by the anchor of the "Albatross," from about 14 fathoms; young valves. U. S. N. Mus. 110,717.

The shell figured by Hupé under the name of *T. inornata* is clearly distinct from that originally so named by Hanley, being an entirely different and much more triangular shape. As the former does not appear to have been described, I propose for it the name of *Macoma hupeana*. It recalls *M. inquinata* Deshayes, but is even shorter, higher, and more triangular.

Psammacoma DALL.

Macoma (Psammacoma) hesperus DALL, n. sp.

Shell yellowish white with occasional brownish, narrow, concentric zones and a pale yellowish flush internally; valves inequilateral, the posterior end shorter, the profile being an elongate oval; beak low, rather pointed, small; anterior dorsal margin nearly straight, gently descending, the anterior end evenly rounded into the slightly arcuate base; posterior dorsal margin straight, more rapidly descending, the posterior end with a narrow, oblique truncation, slightly angular below; surface sculptured with close, minute, concentric lines giving it a silky lustre, and with occasional stronger sulci, indicating resting stages; above the posterior angle the lines are coarser and more elevated, and near the margins are traces of a thin, brownish periostracum; on the disk are also traces of opaque, fine radiating lines, but these do not seem to be reflected in the sculpture; hinge line narrow, within the left valve three small cardinals, the anterior pair closely adjacent, the other more distant; inner surface polished, pallial sinus large, ovate, horizontal, extending in front of the middle of the shell, only slightly coincident with the pallial line below. Lon. of shell, 34; of posterior end, 13; alt. 22; diam. of left valve, 5 mm.

U. S. S. "Albatross," station 2355, Gulf of Panama, in 182 fathoms, mud, bottom temperature 54°.1 F. U. S. N. Mus. 122,936.

Only a single left valve was obtained. The most nearly related species is *M. (Psammotreta) aurora* Hanley, which has a different hinge, and is a broader shell.

Semelidae.

CUMINGIA Sowerby.

Cumingia mutica Sowerby.

At Tomé, Chile, from the mud upon the anchor, were obtained some fragments and small specimens of a Cumingia which are probably the young of *C. mutica*.

(Asthenodonta)

Myacea.

Myacidae.

SPHENIA Turton.

The distinction between this genus and Mya is extremely slight. It has proportionately shorter siphons, and the species recognized are all of small size, but it seems impracticable to discover other differences and I am strongly tempted to relegate it to Mya as a subgenus.

Sphenia subequalis Dall, n. sp.

Shell small, inequilateral, compressed, bluntly rounded at both ends, covered by a yellowish periostracum; beaks low, nearly median, being 3.25 mm. from the anterior, and 3.75 mm. from the posterior end; surface irregularly concentrically ridged, a line from the beaks to the lower posterior angle sets off a subtriangular space on which the periostracum is slightly rougher and darker than on the rest of the shell; posterior end slightly gaping; interior white, polished; left valve with a prominent chondrophore, the anterior ridge upon which is unusually strong; the chondrophore is arcuate somewhat obliquely downward; the pallial sinus is large, rounded, and reaches forward in a vertical sense about to the posterior end of the chondrophoric ridge alluded to. Lon. of shell, 7; alt. 4; diam. of left valve, 1 mm.

U. S. S. "Albatross," station 2779, in Magellan Straits, in about 20 fathoms, gravel, one left valve. U. S. N. Mus. 110,719.

No species of the genus has hitherto been reported from the Magellanic region, and so this solitary valve has a certain interest. It is more nearly equilateral than any of the other species.

Corbulidae.

CORBULA (BRUGUIÈRE) LAMARCK.

CUNEOCORBULA COSSMANN.

Corbula (Cuneocorbula) ira DALL, n. sp.

Shell of moderate size, solid, short and high, whitish covered by a chestnut brown periostracum; valves inequilateral, the posterior end longer, nearly equivalve, the right valve smaller; disk uniformly sculptured with narrow concentric channels, separated by wider, rounded but not cordlike ridges, about two to a millimeter; beaks high, prominent; anterior slope 45°, short, the anterior end attenuated and rounded; base arcuate; posterior end acute, its dorsal slope formed by a wide truncation, bounded by a sharp angle outwardly; within, close to the dorsal margin, is a feeble rounded ridge on each valve, ending distally in an obtuse angle; between the outer and inner ridges the area is slightly concave and concentrically threaded; in front of the beaks there is a small depressed space but no circumscribed lunule; basal margin, with regard to a vertical longitudinal plane, slightly flexuous; left valve edentulous with a small triangular cartilage pit; right valve with a small recurved tooth in front of the pit; interior smooth, yellowish white; pallial line truncate behind but with no sinus; margins entire. Lon. of shell, 11.5; of anterior end, 3.2; alt. 7.5; diam. 6.0 mm.

U. S. S. "Albatross," station 3355, Gulf of Panama, in 182 fathoms, mud, bottom temperature 54°.1 F. U. S. N. Mus. 122,944.

This species is unlike any of those from shallow water in the Panama region, and somewhat resembles *C. knoxiana* Adams, from Jamaica, which is more elongate and has three instead of two ridges on its posterior area.

Saxicavidae.

SAXICAVA Fleuriau de Bellevue.

Saxicava antarctica Philippi.

Saxicava antarctica Philippi, Arch. f. Naturg. 1845, p. 51; E. A. Smith, P. Z. S. Lond., 1881, p. 40; Mabille et Rochebrune, Miss. Cap Horn, Zool., 1889 Moll., **6**, p. H 102.

Saxicava chilensis Hupé, in Gay, Hist. de Chile, Zool., 1854, Moll., **8**, p. 379, pl. **8**, fig. 7.

Saxicava frigida Mabille et Rochebrune, Miss. Cap Horn, Zool., 1889, **6**, p. H 101.

Saxicava lebruni Mabille et Rochebrune, *op. cit.*, p. H 101.

Saxicava mollis Mabille et Rochebrune, *op. cit.*, p. H 102.

U. S. S. "Albatross," station 2780, Straits of Magellan, in 369 fathoms, mud, bottom temperature 47° F. U. S. N. Mus. 96,248. Chonos Id., Philippi; Straits of Magellan at Punta Arenas, and Orange Harbor, New Year Sound and Cape Horn, Mabille; Calbuco, Chile, Hupé.

The genuine and unmistakable *Saxicava arctica* is found at Cape Delgado and Spiring Bay, in Eastern Patagonia, by the evidence of the "Albatross" dredgings. There would therefore be nothing improbable in the extension of its range to the straits and even northward on the other, western coast. I have seen only young specimens, and so can hardly express an opinion as to the validity of Philippi's species, since the similarity of the young is common to many distinct species. I agree with Mr. E. A. Smith in thinking them undistinguishable so far as any material I have seen furnishes evidence. Messrs. Mabille and Rochebrune give no evidence for the validity of their nominally new species. Their diagnoses are without differential or any other characters of consequence, and no figures are furnished. Their species cannot be said to be adequately or recognizably described; I have no doubt of their identity with *S. antarctica* and very little of the identity of that so-called species with *Saxicava arctica* (+ *rugosa*) of the northern hemisphere.

Adesmacea.

Pholadidae.

PHOLADINAE.

XYLOPHAGA Turton.

Xylophaga Turton, Dithyra Brit., 1822, p. 527; type, *X. dorsalis* Turton; not *Xylophagus* Meuschen, 1788.

Xylotomea Dall, Trans. Wagner Inst., 1898, **3**, p. 821.

If the name Xylophaga be rejected on account of the existence of the ancient synonym Xylophagus, a practise which the writer emphatically disapproves, the name Xylotomea may take its place as above indicated.

Xylophaga mexicana Dall, n. sp.

Shell small, short, posterior area rounded behind, concentrically marked only with incremental lines; median furrow wide, channelled, in the adult bounded behind by a flattened thread, in front the elevated margin of the channel is obliquely serrate by the terminations of the sagittate sculpture of the anterior area, which a little more anteriorly becomes very fine, so as to require strong magnification to bring out its character; anterior margin of the valves with a rectangular sulcus, from whose apex an impressed line proceeds to the umbo, the angulation of the sculpture resting on this line; anterior auriculation small; anterior dorsal margin strongly reflected; interior smooth except for a strong flattish rib which extends from the umbo under the middle of the wider external channel; umbo much incurved; myophore small and slender. Alt. 4.2; lon. 5.2; diam. about 4.0 mm.

U. S. S. "Albatross," station 3422, off Acapulco, Mexico, in 141 fathoms, mud, bottom temperature 53.5.

Two right valves were dredged as above.

JOUANNETINAE.

PHOLADIDEA Turton.

Pholadidea (Penitella) minuscula Dall, n. sp.

Shell extremely small, white, subequivalve, with rounded, reflected processes behind, that on the right valve slightly more concave and larger; posterior area sculptured only with incremental lines medial, sulcus shallow; anterior area sculptured with doubly arcuate paired elevated lines, more distant near the sulcus and more crowded anteriorly; these are angulate at a point corresponding to the anterior marginal sulcus, and crossed by sharply incised striae which break them up more or less into segments, especially in front; anterior dorsal margin recurved, with quite a space under the reflection in front of the umbo; mesoplax single, small, elongate; protoplax cordate, small, single; in the adult the callum completely closes the anterior hiatus. Lon. 4.0; alt. 2.5; diam. 2.5 mm.

Boring in the corky envelop of a large seed, dredged by the U. S. S. "Albatross," at station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F.

That the species is adult is evident, because the anterior hiatus is completely closed by a well-calcified callum. It is perhaps the most minute adult pholad yet reported.

Teredinidae.

TEREDO Linné.

? **Teredo,** sp. indet.

A tube, belonging to Teredo or Xylotrya, was dredged by the "Albatross," at station 3393, Gulf of Panama, in 1020 fathoms; but it may have sunk from decayed driftwood disintegrating at the surface of the sea.

ANOMALODESMACEA.

Anatinacea.

(A. EUSIPHONIA.)

Periplomatidae.

PERIPLOMA SCHUMACHER.

Periploma carpenteri DALL.

Plate 16, figure 8.

Periploma carpenteri Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 20.

This species is of much the outline of *P. stearnsii* Dall, and is best described by comparison with it. In *P. stearnsii* the shell is somewhat less inflated and the beaks are nearer the posterior end, but nearer the anterior end in *P. carpenteri;* in the latter the surface granules are more crowded and coarser, and not arranged in rows separated by a clear space, as in *P. stearnsii;* the rostrum in *P. carpenteri* is less distinctly marked off from the arch of the base, the epidermis has a more greenish tint, the interior is more pearly, with a larger pallial sinus, and the chondrophore is wider and vertically, not obliquely, directed. The right valve is 10 mm. in diameter, with a height of 39 and a length of 47 mm.

Only one right valve was dredged, in the Gulf of Panama, at the U. S. S. "Albatross" station 3389, in 210 fathoms, mud, bottom temperature 48°.8 F. U. S. N. Mus. 106,891.

This is the third orbicular species from West America.

Periploma stearnsii DALL.

Plate 16, figure 5.

Periploma stearnsii Dall, Proc. U. S. Nat. Mus., 1896, **18**, p. 19.

Shell suborbicular, thin, whitish, with pale straw-colored epidermis, sculptured with faint concentric irregularities harmonizing with the lines of growth, and by very fine pustules arranged in radiating lines, stronger and more adjacent near and upon the rostrum; beaks not prominent, fissured; left valve slightly less convex than the right; rostrum about two thirds as wide as the shell, not strongly differentiated, but with the epidermis coarser, and, especially on the left valve, more raised and wrinkled, and the basal margin slightly excavated; interior faintly pearly; pallial sinus large, rounded, shallow; chondrophore strong, spoon-shaped, inclined obliquely forward. Length of shell, 46; height, 35.5; diameter of the right valve, 9 mm.; the rostrum, 20 mm. wide, rounded, and moderately gaping; total diam. 18 mm.

U. S. S. "Albatross," station 3034, off Point Fermin, at the head of the Gulf of California, in 24 fathoms, mud, bottom temperature 63°.5 F. U. S. N. Mus. 110,548.

This differs from *P. discus* Stearns, in the radial arrangement and larger size of its surface granules, its wider rostrum, and more compressed form. It needs no comparison with other species.

HALISTREPTA Dall.

Halistrepta Dall, Nautilus, March, 1904, **17**, p. 123; type, *Periploma sulcata* Dall.

Periploma (Halistrepta) sulcata Dall.

Plate 15, figure 10.

Periploma sulcata Dall, Nautilus, March, 1904, **17**, p. 122.

San Pedro, California, on the beach; collected by Mrs. Oldroyd.

I take this opportunity of illustrating this rare, interesting, and unfigured species.

Lyonsiidae.

LYONSIA Turton.

Lyonsia panamensis Dall, n. sp.

Plate 18, figure 12.

Shell thin, slightly inequivalve, inequilateral, subquadrate, translucent whitish, with a very thin greenish-gray periostracum; beaks large, full, somewhat anterior, prosogyrate; no lunule or escutcheon; anterior end short, rounded, anterior dorsal slope rapidly descending; posterior dorsal slope more horizontal and longer; posterior end subtruncately rounded; base gently arcuate; surface covered with radiating close lines of granules, of which about every fourth line is more prominent than the others; numerous fine sand grains are adherent to the surface; interior perlaceous, finely radiately striate; scars conspicuous, the anterior larger; pallial sinus wide, shallow; hinge feeble, a single obscure tooth and short nymph in the right valve; ligament feeble, almost internal. Lon. 13.5; beaks behind anterior end, 6.5; alt. 10.0; diam. of right valve, 4.5 mm.

U. S. S. "Albatross," station 4630, Gulf of Panama, Mariato Point N. 70° E. fifty-one miles, in 556 fathoms, sand, bottom temperature 40°.5 F. U. S. N. Mus. 110,584.

Only the right valve was obtained.

Verticordiidae.

LYONSIELLA Sars.

Lyonsiella pacifica Dall, n. sp.

Shell small, plump, white, subquadrate, microscopically radiately closely granulately striate, covered more or less densely with adherent sand grains and foraminifera; beaks large for the size of the shell, high, prosogyrate with a small cordate impressed area in front of them; anterior end very short, small, posterior longer, wider, rounded; base arcuate, prominent in the middle; no external ligament; surface closely covered with radial rows of extremely minute granules. Lon. 3; alt. 2.7; diam. 1.8 mm.

U. S. S. "Albatross," station 4693, Mid Pacific, northwest point Sala y Gomez Island, bearing N. 82° E., fifteen miles, in 1142 fathoms, gravel, bottom temperature 35°.4 F. U. S. N. Mus. 110,583.

Only a single specimen of this finely granulose species was obtained. In form it is not unlike the much larger *L. papyracea* Smith, figured in the "Challenger" Report, but the sculpture is quite different and the shell is proportionately more compressed. It is impossible to determine whether the specimen is adult or not, but it has a mature aspect.

Poromyacidae.

POROMYA Forbes.

Poromya Forbes, Aegean Rep. Brit. Assoc., 1844, p. 103; type, *P. anatinoides* Forbes, *l. c.*, = *P. granulata* Nyst (as *Corbula*).

Embla Lovén, Ind. Moll. Scand. Occ., 1846, p. 46; type, *E. korenii* Lovén (= *granulata* Nyst).

Ectorisma Tate, Trans. Roy. Soc. Austr., 1902, **15**, p. 127, pl. **1**, fig. 3; Hedley, Proc. Lin. Soc. N. S. Wales, 1906, p. 539; type, *E. granulata* Tate (not of Nyst). Hedley, Rec. Austr. Mus., 1907, **6**, p. 302, makes Tate's species probably identical with *Poromya laevis* Smith, of the "Challenger" Report.

Poromya perla Dall, n. sp.

Plate 18, figures 2, 5.

Shell small, globose, exceedingly thin, whitish, subequivalve, subequilateral, with very high swollen, strongly prosocoelous beaks; no lunule or escutcheon, but the posterior hinge margin of the right valve overlaps that of the left, with a single, strong, radial rib near the edge, which does not appear in the opposite valve; anterior margin of the valves evenly rounded into the nearly semicircular base; posterior slope straight; posterior end short, somewhat compressed and attenuated; surface covered with almost microscopically minute granules arranged in radial lines except where removed by friction; the disk of the shell shows their scars on its otherwise polished surface. Lon. 5.7; alt. 5.3; diam. 4.4 mm.

U. S. S. "Albatross," station 3392, Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F. U. S. N. Mus. 122,931.

A single specimen of this minute, thin species was obtained. It is so fragile that it is impracticable to open the valves, so the hinge remains undescribed. The shell has the surface of a Poromya; another specimen, apparently identical but larger, measures: lon. 9.5; alt. from the basal margin to hinge line, 7.5; total alt. 9.0; diam. 8.0 mm. In this specimen a single delicate flattened right cardinal fits under the hinge margin of the left valve, while a long posterior lateral lamina in the latter underlies the right posterior hinge margin. These teeth differ from those of the typical Poromya in being thin and lamellar, but are similarly located. The second specimen is from the Ecuador coast, in 1132 fathoms, ooze, bottom temperature 36° F. U. S. N. Mus. 122,930.

Dermatomya Dall.

Dermatomya Dall, Proc. U. S. Nat. Mus., 1889, **12**, pp. 289, 291; type, *P.* (*D.*) *mactroides* Dall, *l. c.* p. 291, pl. **8**, figure 8.

Poromya (Dermatomaya) mactroides Dall.

U. S. S. "Albatross," station 2781, southern coast of Chile, or western Patagonia, in 348 fathoms, mud, bottom temperature 49°.9 F. Type, figured in 1889, U. S. N. Mus. 122,733. Also at stations 2783, in 122 fathoms, temperature 48°, and 2785, in 449 fathoms, temperature 47° F.

When this species was first described the description and figure were made from the type above referred to, of which the measurements were: lon. 10; alt. 8; and diam. 7 mm. But a larger specimen turning up later, and being supposed to be an adult, the measurements were taken from that specimen which was from the coast of Ecuador. Now better specimens having become available, the large form proves to be distinct, and the measurements taken from it are therefore no longer applicable to *P. mactroides* and should be corrected accordingly, while the locality at station 2793, off the coast of Ecuador, should be expunged entirely so far as *P. mactroides* is concerned. It belongs to the next species.

Poromya (Dermatomya) equatorialis Dall, n. sp.

Plate 5, figures 1, 2.

Shell subtrigonal, inflated, slightly inequivalve, white covered by a strong dark olive-gray periostracum, paler near the basal margin; surface smooth except for lines of growth, without granulation or surface striation; form as figured; interior bluish white, slightly pearly; ligament and resilium combined, short, set obliquely, internally, under and behind the beaks; there is no lithodesma; hinge comprising one stout cardinal, prominent in the left valve entering a socket in the opposite valve in front of a long, nearly horizontal lamina, which forms the base of the resiliary pit; there is also one strong posterior left lateral, and a feeble anterior one on the same valve, which last is hardly to be distinguished from an angularity of the hinge margin; pallial sinus wide, rounded, rather short. Length of shell, 18; alt. 15; max. diam. 5 + 6.5 mm., the smaller dimension being that of the left valve, which basally fits inside the other and has a slightly tortuous margin behind.

U. S. S. "Albatross," station 3360, Gulf of Panama, in 1672 fathoms, sand, bottom temperature 42° F.; U. S. N. Mus. 122,942. Also at station 2793, off the coast of Ecuador, in 741 fathoms, mud, temperature 38°.4 F.

This species, beside its much greater size, has beaks more inflated and higher, and the posterior end blunter than we find in *P. mactroides.*

Poromya (Dermatomya) chilensis Dall, n. sp.

Shell small and rather thin, iridescent under a pale yellowish-olive periostracum; valves subequal; inequilateral; anterior end shorter, narrower, rounded; posterior longer, wider, also rounded; beaks inflated but not very high; a single small ridge or angle extends from the beak to the lower posterior end of the shell, forming a posterior dorsal area over which the periostracum is darker and more or less wrinkled; beaks three eighths of the total length from the anterior end; surface smooth and almost polished, except for faint incremental lines; interior pearly, pallial sinus shallow but wide and very distinct; hinge essentially as in the other species, but the cardinal long and slender, and the margins of its socket in the opposite valve prominent, almost like incipient teeth; the laterals are almost obsolete. Length of shell, 8; alt. 7.7; diam. 2.5 + 3.0 mm.

U. S. S. "Albatross," station 2785, off the coast of southern Chile, in 449 fathoms, mud, bottom temperature 47°F. U. S. N. Mus. 97,135.

This species has almost exactly the general form of *Kellia suborbicularis* and is about the size of the average adult *Kellia*. The radial keel and rounded form separate it from the young of the other species.

Another and still larger species than any of the above is found in deep water off the North Pacific Coast in about latitude 50°.

CETOCONCHA Dall.

Cetoconcha Dall, Bull. Mus. Comp. Zoöl., Sept., 1886, **12**, p. 280; type, *Lyonsia bulla* Dall, Bull. Mus. Comp. Zoöl., 1889, **18**, p. 452, pl. **39**, figs. 2, 5; Trans. Wagner Inst., 1895, **3**, p. 536; Proc. U. S. Nat. Mus., 1889, **12**, p. 289.

Silenia E. A. Smith, Challenger Rept., 1885, Lam., p. 75; type, *S. sarsii* Smith (not *Silenia* Mulsant, *Coleoptera*, 1873).

Cetoconcha smithii Dall, n. sp.

Plate 18, figure 10.

Shell extremely thin, subequivalve, inequilateral, oval, white, with a very thin, dehiscent, pale brownish periostracum; hinge consisting of a minute obsolete tubercle in the right valve and two small, narrow nymphs bearing a slight, short ligament; beaks low, slightly prosocoelous, situated $\frac{8}{19}$ of the whole length behind the anterior end; valves evenly convex, polished, with minute radiating lines of microscopic granules which are most apparent near the posterior end, but can be traced over the entire surface; ends of the shell of about equal rotundity, base evenly arcuate, margins entire; interior polished, the muscular scars hardly visible. Lon. 19.0; alt. 14.0; of beaks, 1.5; diam. 11.0 mm. The right posterior hinge margin, bordered by a closely adjacent radial ridge, slightly overlies the margin of the opposite valve along a length of about 7.0 mm.

U. S. S. "Albatross," station 3415, off Acapulco, Mexico, in 1879 fathoms, globigerina ooze, bottom temperature 36° F. U. S. N. Mus. 122,943.

Named in honor of the ever courteous and accomplished Mr. E. A. Smith of the British Museum of Natural History.

Cetoconcha scapha Dall.

Cetoconcha scapha Dall, Proc. U. S. Nat. Mus., 1902, **24**, p. 561; 1903, **26**, p. 951, pl. **62**, fig. 13.

U. S. S. "Albatross," station 3367, Gulf of Panama, in 100 fathoms, rocky bottom, temperature 57° F. U. S. N. Mus. 109,026.

A single specimen only was obtained. It is smaller, more elongate and arcuate than the *C. smithii.*

Cuspidariidae.

CUSPIDARIA Nardo.

Nardo's genus dates from 1840, but ten years earlier Wilton had figured in the Quarterly Philosophical Journal (p. 73) a valve of a fossil bivalve apparently belonging to this genus, to which he gave the generic name Ryderia. Curiously enough, he did not name the species, and the generic name therefore was in the condition of having no named type or species belonging to it, which under the rules would appear to render the name Ryderia futile.

Cuspidaria s. s.

Cuspidaria patagonica Smith.

Neaera patagonica E. A. Smith, Challenger Rept., 1885, Lam., p. 39, pl. **7**, fig. 5, 5a–b.

Cuspidaria patagonica (anatomy) Dall, Bull. Mus. Comp. Zool., 1889, **18**, pp. 443, 447.

Challenger Expedition, Station 305, west coast of Patagonia, in 165 fathoms, mud.

U. S. S. "Albatross," station 2792, off Manta, Ecuador, in 401 fathoms, mud, bottom temperature 43° F. U. S. N. Mus. 95,418. Also at station 2780, 2781, and 2782, southern coast of Chile, in 258 to 369 fathoms, mud, temperatures 47° to 50°; and a broken specimen, probably of this species, at station 3360, in 1672 fathoms, sand, Gulf of Panama, temperature 42° F.

This widely distributed species is somewhat notable for its long, slender, and twisted rostrum, which is smaller in caliber, considering its length, than that of any other of the large species yet made known.

Cuspidaria panamensis Dall, n. sp.

Plate 16, figure 2.

Shell large, inflated, rostrate, equivalve, subequilateral, white, covered with a yellowish-brown periostracum, paler toward the middle of the disk; surface sculptured only with lines of growth; rostrum small, short, somewhat recurved, gaping at the extremity; beaks inflated, high, opisthogyrate; lunule none, but a long, lanceolate, impressed, smooth escutcheon, the larger part of which is in the left valve; form as figured; interior white, the hinge as usual; in the right valve the ligamentary nymph (which is distinct from the resiliifer), is so prominent as to appear like a tooth; there is no pallial sinus. Lon. 42; alt. 25; diam. 23 mm. There is a small lithodesma.

U. S. S. "Albatross," station 3394, in the Gulf of Panama, in 511 fathoms, mud, bottom temperature, 41°.8 F. U. S. N. Mus. 122,937.

A large species, not in general unlike *C. glacialis* Sars, but with a smaller, more distinctly defined and proximally constricted rostrum.

Cuspidaria (Cardiomya) pseustes Dall, n. sp.

Shell large for the genus, rostrate, inflated, nearly equivalve, inequilateral, whitish, with a thin, greenish-gray periostracum; beaks rather low, but full, distinct, situated in advance of the middle of the shell, and separated by a long, narrow, longitudinally faintly striated, amphidetic, impressed area, wider behind the beaks; anterior dorsal margin straight, abruptly declining to the rotundity of the anterior end; base evenly arcuate; posterior dorsal slope slightly concavely arcuate as the rostrum recurves a little; end of the rostrum gaping and roundly truncate; surface radially very finely threaded above, crossed by concentric wrinkles of the periostracum; proximal end of the rostrum somewhat constricted; disk radially threaded, the threads rounded, with wider interspaces and occasional more slender intercalary threads; the major threads near the middle of the base are about one millimeter apart; interior whitish, the sculpture reflected by grooves corresponding to the external ridges; hinge normal; interior of the rostrum corresponding to the dorsal area smooth. Lon. of shell, 27; of posterior end, 16; alt. 17; diam. 15 mm.

U. S. S. "Albatross," station 3392, in the Gulf of Panama, in 1270 fathoms, hard bottom, temperature 36°.4 F.

It is possible that more material may show that this is merely a variety of *C. planetica*, but for the present it seems safer to keep them separate. As in all these species, the basal margins are somewhat flexuous. Measurements have been made for the length of the shell parallel to the hinge line, and the height of the shell is taken at right angles to this length.

Cuspidaria (Cardiomya) planetica Dall, n. sp.

This species has a generally similar aspect to the *C. pseustes* above described and differs in the following particulars: the rostrum is less constricted at the proximal end, so that the whole shell is more attenuated backward; there is not so much distinction between the disk and the rostrum; the impressed area, along the dorsal margin, is smaller and is not amphidetic, but ceases to be defined in front of the beaks; the radial major threads appear stronger and less numerous; the chondrophore or fossette is much less conspicuous and is formed by a small pit in the cavity under and almost behind the hinge margin, while in pseustes it is a comparatively large vertically projecting spoon-shaped process; the general form of *C. planetica* is more elongate and the anterior patulous extension is directed forward rather than obliquely downward; lastly *C. planetica* is uniformly smaller. Length of shell, 24; of posterior part behind the beaks, 13; alt. 14; diam. 11 mm.

U. S. S. "Albatross," station 2925, off San Diego, California, in 339 fathoms, mud, bottom temperature 42°.9 F. Types U. S. N. Mus. 110,720. Also at station 3400, east of the Galapagos Islands, in 1322 fathoms, ooze, temperature 36°; station 3059, off Siletz Bay, Oregon, in 77 fathoms, mud, temperature 45°.1; and station 3609, in Bering Sea, southeast of the Pribiloff Islands, in 74 fathoms, mud and sand, bottom temperature 38° F. It has also been collected from deep water, 85 fathoms, in Captain's Harbor, Unalashka, Aleutian Islands. The extreme stations are about 3500 miles apart.

A few specimen stations have been selected to show the immense range of this widely distributed species. It will be noted that it descends from about 80 fathoms in the north to over 1300 fathoms in the tropics, following the sea isotherms, and this I may add without altering its appearance in the least, notwithstanding the immense difference in pressure. Living in these depths near the Galapagos Islands, it would be no surprise to find it anywhere still farther south.

Cuspidaria (Luzonia) chilensis Dall.

Cuspidaria (*Luzonia*) *chilensis* Dall, Proc. U. S. Nat. Mus., 1889, **12**, p. 282, pl. **13**, fig. 13.

Shell small, thraciaeform, smooth, polished, greenish white, inequivalve, nearly equilateral, briefly rostrate; right valve larger, convex, rounded in front; beaks small, prominent, slightly incurved; neither lunule nor escutcheon present; posterior end strongly and suddenly compressed, the compressed portion bounded in front by a depressed ray extending from the beak to the posterior basal margin; posterior end short and rounded, somewhat narrower than the anterior; left valve similar but smaller and less convex, at the posterior hinge line underlying the margin of the right valve; hinge with a small roundish projecting chondrophore which extends under the margin of the left valve to which it is united by the resilium; there is no ossiculum; the periostracum is papery and caducous, visible chiefly at the posterior and basal margin. Lon. 6.0; alt. 4.5; diam. 2.7 mm.

U. S. S. "Albatross," station 4654, twenty-four miles N. 68° W. of Aguja Point, Peru, in 1036 fathoms, mud, bottom temperature, 37°.3 F. U. S. N. Mus. 110,582. The original type was obtained on the southwest coast of Chile, at station 2791, in 677 fathoms, mud, bottom temperature, 37°.9 F.

The specimen was badly smashed, but it was possible to determine, that it, in all probability, belonged to this species.

MYONERA Dall.

Myonera garretti Dall, n. sp.

Plate 5, figure 4.

Shell extremely thin, white, polished, with a pale straw-colored periostracum, of general corbuloid form, and edentulous hinge; valves convex, compressed suddenly behind; anterior part convex, with about fifteen concentric sharp ripples, with much wider interspaces; these ripples start from the anterior margin, on the upper half of the disk, are obsolete on the dome of the valve; near the margin they extend further back, nearly reaching the first radial rib; the remaining concentric sculpture is of fine lines of growth over the whole surface; the radial sculpture consists of, on the left valve, a single strong radial rib extending from beak to basal margin and bounding in front the compressed triangular rostrum; on the right valve there is a weak rib separated by a wide, shallow, excavated channel or trough, from a second strong rib corresponding to that of the opposite valve; there is no lunule or distinct escutcheon, but the pointed, short, posterior, compressed end of the shell is triangular, bluntly rounded off at the extremity, rostrate, and a little flexuous; ligament thin, elongate; resilium short, with a narrow rather long rectangular ossiculum; the interior polished, the scars invisible; margins entire, except a small prominence at the end of the radial ribs. Lon. 13.5; alt. of shell, 11.0; of beaks, 1.5; diam. 9.0 mm.

U. S. S. "Albatross," station 3380, southeast from Malpelo Island, Gulf of Panama, in 899 fathoms, hard bottom, temperature 37°.2 F. U. S. N. Mus. 122,941.

This has a general similarity to *M. bicarinata* Smith and *M. paucistriata* Dall, of the Indian Ocean and Atlantic, but differs in details of sculpture. It is named in honor of the late commander of the "Albatross," who was unfortunately lost overboard during heavy weather, near the Hawaiian Islands.

Notes on the Littoral Species.

Since the distribution of species upon islands is a matter of interest I add the following lists of littoral or beach shells collected by the "Albatross," party during visits to the islands in the Bay of Panama, to Malpelo and Cocos Islands, Manga Reva in the Paumotu group, and especially to Easter Island, which, from its isolated position as the most eastern outpost of the Polynesian archipelago, is seldom visited, and I believe has never been visited with the purpose of studying the molluscan fauna.

I may add that some slugs collected on the shore at Easter Island and submitted to Dr. H. A. Pilsbry were reported by him to be the ordinary European species, *Limax gagates*, probably introduced in the packing about freight consigned to local traders.

SHORE SHELLS FROM PANAMA BAY.

Conus nux Broderip. Perico Id.
Drillia aterrima C. B. Adams. Perico Id.
Mangilia lineolata Reeve. Taboguilla Id.
Mitra gigantea Sowerby.
Mitra tristis Broderip.
Mitra lens Wood.
Leucozonia cingulata Lamarck.
Latirus ceratus Wood. Taboguilla Id.
Alectrion versicolor C. B. Adams. Taboguilla Id.
Alectrion scabriusculus Powis.
Anachis boivini Kiener. Perico Id.
Anachis varia Sowerby. Perico Id.
Anachis sulcosa Sowerby. Taboguilla Id.
Columbella fuscata Sowerby. Taboguilla Id.
Columbella major Sowerby. Taboguilla Id.
Nitidella cribraria Lamarck. Taboguilla Id. Perico Id.
Engina carbonaria Reeve. Taboguilla Id. Perico Id.
Engina ferruginea Reeve.
Cantharus gemmatus Reeve. Taboguilla Id.
Cantharus sanguinolentus Duclos. Taboguilla Id.
Murex humilis Broderip. Perico Id.
Muricidea dubia Swainson. Taboguilla Id.
Muricidea squamulata Carpenter.
Thais melones Duclos. Taboguilla Id.
Acanthina brevidentata Gray. Taboguilla Id.

Siphonium centiquadra Valenciennes.
Turritella goniostoma banksii Reeve.
Cerithium uncinatum Gmelin. Taboguilla Id.
Cerithium stercus-muscarum Valenciennes. Taboguilla Id.
Cerithium maculosum Kiener. Taboguilla Id.
Cerithiopsis neglecta C. B. Adams. Perico Id.
Triforis panamensis Bartsch.
Planaxis planaxis Wood. Taboguilla Id.
Rissoina fortis C. B. Adams. Perico Id. Taboguilla Id.
Crepidula onyx Sowerby.
Cypraea exanthema Linné.
Cypraea punctulata Gray.
Cypraea arabicula Lamarck.
Cypraea (Pustularia) pustula Swainson.
Acmaea fascicularis Menke. Perico Id. Taboguilla Id.
Nerita scabricosta Lamarck.
Nerita bernhardi Recluz. Perico Id. Taboguilla Id.
Chlorostoma inerme Gmelin.
Omphalius reticulatus Gray.
Fissurella mexicana Sowerby. Taboguilla Id.
Fissurella nigropunctata Sowerby. Taboguilla Id.
Chiton stokesii Broderip. Taboguilla Id.
Ischnochiton pectinulatus Carpenter. Taboguilla Id.
Ischnochiton ophioderma Dall. Perico Id.
Callistochiton periconis Dall. Perico Id.
Mytilus multiformis Carpenter. Taboguilla Id.
Myoforceps attenuatus Deshayes. Perico Id.
Melina chemnitziana Orbigny. Taboguilla Id. Perico Id.
Margaritiphora fimbriata Dunker. Taboguilla Id.
Lima angustata Reeve. Perico Id.
Anomia lampe Gray.
Arca mutabilis Sowerby. Taboguilla Id.
Arca illota Sowerby. Taboguilla Id.
Arca alternata Sowerby. Taboguilla Id.
Carditamera affinis Broderip. Perico Id.
Chama buddiana C. B. Adams. Taboguilla Id.
Protothaca grata Say. Taboguilla Id.
Kellia suborbicularis Montagu. Taboguilla Id.

Shore Shells from Cocos Island.

Melampus panamensis C. B. Adams.
Siphonaria gigas Sowerby.
Mitra lens Wood.
Latirus tuberculatus Broderip.
Murex humilis Broderip.
Thais melones Duclos.
Thais patula Linné.

Thais columellaris Lamarck.
Cerithium maculosum Kiener.
Littorina conspersa Philippi. Also from Malpelo Island.
Planaxis planaxis Wood.
Nerita scabricosta Lamarck.
Chiton stokesii Broderip.
Melina chemnitziana Orbigny.

Shells collected on the reefs and beaches of Easter Island.

Melampus philippii Küster.
Smaragdinella viridis Rang, both brown and green varieties.
Conus militaris Hwass.
Mitra (Cylindra) nucea Gronovius.
Columbella lutea Quoy.
Thais nesiotes Dall (n. sp.).
Colubraria (Taeniola) decollata Sowerby.
Pascula citrica Dall (n. sp.).
Vermetus sp.
Triforis sp.
Planaxis mollis Sowerby.
Tectarius pyramidalis Quoy.
Hipponix antiquatus Linné.
Hipponix grayanus Menke.
Hipponix barbatus Sowerby.
Cheilea equestris Linné.
Cypraea caput-draconis Melvill.
Cassis vibex Linné.
Strombus maculatus Nuttall.
Polynices sebae Souleyet.
Eulima cumingi A. Adams.
Janthina communis Lamarck.
Nerita atrata Reeve.
Fissurella sp. (immature).
Pecten (Hinnites ?) pasca Dall (n. sp.).
Lima lima Linné.
Jagonia ramulosa Gould.
Chama broderipii Reeve.
Semele australis Sowerby.

Species collected from the Reefs and Beaches of Manga Reva Island, Paumotu Group.

Conus miliaris Hwass.
Thais hippocastanea Linné.
Rissoina ambigua Gould.
Cypraea moneta Linné.
Cymatium tuberosum Lamarck.

Tectarius coronaria Lamarck.
Planaxis lineata Da Costa.
Littorina obesa Sowerby.
Nerita polita Linné.
Nerita plicata Linné.
Lima angustata Reeve.
Pecten (Chlamys) pallium Linné.
Melina costellata Conrad.
Margaritiphora radiata Pallas.
Tridacna intermedia Stearns.
Circe pectinata Lamarck.

While on the subject of Polynesian faunas I may add the following list from Flint Island, near Tahiti; collected by members of the Smithsonian Solar Eclipse Expedition in charge of Mr. C. G. Abbott, in December, 1907:

Conus lividus Hwass.
Conus vexillum Gmelin.
Conus miles Linné.
Conus catus Hwass.
Conus hebraeus Linné.
Conus tulipa Linné.
Conus pusillus Lamarck.
Conus archiepiscopus Bruguière.
Vasum ceramicum Linné.
Mitra limbifera Lamarck.
Mitra ambigua Swainson.
Murex adustus Lamarck.
Thais hippocastanea Lamarck.
Ricinula digitata Lamarck.
Ricinula ricinus Linné.
Ricinula horrida Lamarck.
Sistrum morus Linné.
Sistrum cancellatum Quoy.
Iopas sertum Linné.
Vexilla vexillum Lamarck.
Rhizochilus madreporarum Gould.
Cassis rufa Linné.
Cypraea isabella Linné.
Cypraea poraria Linné.
Cypraea cicercula Linné.
Cypraea scurra Linné.
Cypraea arabica Linné.
Cypraea arabicula Linné.
Cypraea moneta Linné.
Cypraea testudinaria Linné.
Cypraea irrorata Solander.

Bursa cruentata Sowerby.
Cymatium aquatile Reeve.
Cymatium rubecula Lamarck.
Cerithium echinatum Lamarck.
Littorina obesa Sowerby.
Modulus tectum Gmelin.
Cheilea equestris Linné.
Nerita plicata Linné.
Turbo argyrostomus Linné.
Astraea confragosa Gould.
Pecten (Chlamys) pallium Linné.
Melina costellata Conrad.
Arca reeveana Orbigny.
Jagonia ramulosa Gould.
Tridacna squamosa Lamarck.
Trapezium guiniacum Lamarck.

For assistance in identifying the species in the above lists, I am indebted to Mr. W. B. Marshall of the National Museum.

BRACHIOPODA.

NEOTREMATA.

Discinacea.

Discinidae.

DISCINISCA Dall.

DISCINISCA s. s.

Discinisca lamellosa Broderip.

A dead valve was dredged off the Peruvian coast at U. S. S. "Albatross" station 4672, in 2845 fathoms, but it is probable that it was drifted from shallow water, or was disgorged by a fish, as these common species of Discinisca are known to live only in very moderate depths.

Discinisca strigata Broderip.

A specimen of this species was obtained on the shore, between tides, on one of the islands of Panama Bay, by the "Albatross," party. The species ranges from the Gulf of California to Peru and has been found at San Diego, California, in the vicinity of the marine railway, where it is believed to have been scraped off the bottom of one of the small vessels which trade in the Gulf of California from San Diego, and which are cleaned there frequently; at all events it has not become acclimated in San Diego harbor.

PELAGODISCUS Dall, nov. sect.

Discinisca atlantica King.

Collected by the "Challenger" expedition, at station 299, off Valparaiso, in 2160 fathoms, mud, bottom temperature 34° F. U. S. S. "Albatross," station 4709, southwest of the Galapagos Islands, in 2035 fathoms, temperature 35°.3 F.

The typical Discinisca has the distal ends of the brachia coiled, but in this widely distributed abyssal form the brachia form two simple loops with no spiral whatever. The lower valve is very thin and fragile; it is almost impossible to detach it from the animal, owing to the hourglass shape and great solidity of the peduncular muscles. It is smooth and without the concentric or radial sculpture found in the shallow-water species. It is also markedly smaller than the upper valve, and the closely adherent lower half of the mantle bears peripherally only short setae, the very long setae with prickly surfaces, characteristic of this species, are confined to the edge of the upper lobe of the mantle. The rather poorly preserved specimen upon which these observations were made was collected in the North Atlantic, off Martha's Vineyard, by the "Albatross." One young specimen was obtained from the Pacific in the "Albatross" dredgings, on a manganese nodule.

Craniidae.

CRANIA Retzius.

Crania patagonica Dall.

Crania patagonica Dall, Proc. U. S. Nat. Mus., 1902, **24**, p. 562; 1903, **26**, p. 950, pl. **62**, figs. 1, 3.

U. S. S. "Albatross," station 2783, west coast of Patagonia, in 122 fathoms, mud, bottom temperature 48° F. U. S. N. Mus. 96,913.

The single upper valve upon which this species was founded is quite sufficient to distinguish it from any other. No other species of Crania has been described having the upper surface of the valve decorated with little sharp tubercles, which under the lens have the appearance of very short spines.

In his report of the Belgica Antarctic expedition brachiopods (Anvers, Dec., 1901) Joubin states that *Crania pourtalesii* Dall has been reported from Cape Horn, and in fact I find the name cited without comment in the list of species from Cape Horn given by Fischer and Oehlert as collected by the Mission to Cape Horn. Whether a specimen too imperfect to afford material for study was provisionally referred to the West Indian Crania, or why no further remark was made about it, I am unable to say, but it may have been a specimen or fragment of the present species, as it seems improbable that *C. pourtalesii* should extend from the tropics to the Antarctic. It is quite evident from the excellent magnified figure given by Joubin that his *Crania lecointei* from south latitude 70° 23′, in about 250 fathoms, of which two specimens were obtained, is a distinct species, which so far as we know does not reach the Magellanic region.

TELOTREMATA.

Rhynchonellacea.

Rhynchonellidae.

HEMITHYRIS D'ORBIGNY.

Hemithyris craneana DALL.

Hemithyris craneana Dall, Proc. U. S. Nat. Mus., 1894, **17**, p. 717, pl. **31**, figs. 5, 6.

U. S. S. "Albatross," station 3362, off Cocos Island, Gulf of Panama, in 1175 fathoms, mud, bottom temperature 36°.8 F. U. S. N. Mus. 122,861.

A species of the general type of *H. cornea* Fischer, of the North Atlantic. Only one specimen was obtained.

Hemithyris strebeli DALL, n. sp.

Shell extremely thin and fragile, of a translucent very pale gray color, markedly wider than high, smooth and polished, except for occasional concentric lines due to resting stages; the surface under a lens shows a coarse prismatic structure, the imbricating ends of the prisms almost giving the effect of fine punctation; beak low, sharp, small, with a wide delthyrium, widely triangular discrete deltidial plates, and a small foramen, incomplete below; dorsal valve in the young flattish, in the adult deeply widely excavated mesially, with the anterior margin prominently extended into a correspondingly wide sinus in the margin of the ventral valve; ventral valve convex, in the adult almost trilobed with a broad, prominent mesial anterior convexity and corresponding marginal sulcus; interior of dorsal valve with a short, very low, thread-like septum about equal to one fourth the height of the valve; the hinge teeth close together, small, short, without props; muscular impressions obscure; crura short, blade-like, recurved, very easily detached; ventral valve with no septum, the hinge teeth propped by plates between which and the valve are narrow recesses. Alt. 17; lat. 19; lat. of median sulcus, 11; max. diam. 9.5 mm.

U. S. S. "Albatross," station 4721, in Mid Pacific, in 2084 fathoms, globigerina ooze, bottom temperature 35°.1 F. U. S. N. Mus. 110,741. Also at station 4709, southwest of the Galapagos group, in 2035 fathoms, ooze, temperature 35°.3 F.

This shell is distinguishable from any other described species by its low beak, wide trilobate form, and especially by having the median sulcus concave in the dorsal valve, a feature characteristic of no other described recent species. It is named in honor of Dr. Hermann Strebel of Hamburg, Germany, whose admirable contributions to the knowledge of the Mollusca of the Antarctic region and Mexico are known to all malacologists.

In this connection it seems not improper to notice here another remarkable member of this family which was dredged by the "Albatross" on the west coast of Hawaii, in about 200 fathoms, in 1903.

BASILIOLA Dall, n. gen.

A Hemithyris in which the deltidial plates join in the middle line before the foramen of the ventral valve, then are reflected backward and upward within the cavity of the beak until they meet each other, thus forming in the cavity of the beak a wide tube with free anterior edges (except in the senile stage of the shell) and soldered to the inside of the umbonal cavity laterally and near the foramen. The posterior free edges of the deltidia, which form part of the margin, anteriorly, of the foramen are produced and funicular; the dorsal anterior margin of the internal tube is produced beyond the margin of the deltidium as seen externally, in two small pointed folds of a W shape, which perhaps serve as a myophore. There is no septum in either valve; in youth and middle age the hinge teeth are supported by high props in the ventral valve, the cavity behind which, on each side, becomes in the senile stage more or less filled with a shelly deposit; the hinge plate and crura as in Hemithyris, but the hinge teeth sharply cross-striated. The valves are sinuated in front, and the surface of the shell is smooth.

Type, *Hemithyris beecheri* Dall, 1895.

This remarkable form will be described and illustrated in my forthcoming report on the Mollusks of the Hawaiian voyage of the "Albatross."

Terebratulacea.

Terebratulidae.

TEREBRATULINA D'Orbigny.

Terebratulina n. sp.

This species, under the name of *T. crossei* Davidson, originally described from Japan, is reported by Fischer and Oehlert as obtained in the Magellanic region in New Year Sound and near Punta Arenas, in 9 to 184 fathoms, temperature 7° to 8°.2 C. (44°.6–46°.7 F.). I am informed by Dr. Blochmann of Tubingen, who is engaged in a critical study of the species of this genus, that the Magellanic species is distinct from that of Japan, as might be expected. It resembles somewhat *T. kiiensis* Dall and Pilsbry, but is not yet named.

LIOTHYRINA Oehlert.

Liothyrina uva Broderip.

This species was originally described from shallow water, 8 to 12 fathoms, off the west coast of Mexico, near the Isthmus of Tehuantepec. This being the case, it must live there in water of high temperature, probably about 65° F. I have an authentic specimen from shallow water on the coast of Peru. One characteristic of this species, almost unique in its group, is the presence of slightly elevated radiating lines visible only with a good light and under the lens. Fischer and Oehlert, in their report on the brachiopods of Cape Horn, figure some shells under the name of *Liothyrina moseleyi* Dav., which are lately referred by Blochmann,[1] on the strength of a specimen received from the Paris Museum, to *L. uva*. It is entirely possible that the specimens referred to *L. moseleyi* were mixed, and that a specimen of *L. uva* was sent to Blochmann; but the specimens figured by Fischer and Oehlert are, as they state, more nearly circular in outline than typical *L. uva*, and come from water of a temperature between 6° and 8° C. (42°.8–44°.4 F.), which is much colder than that in which *L. uva* is known to occur. Moreover, the "Albatross" dredged a specimen, agreeing almost exactly with the *L. moseleyi* of the Antilles, 150 miles off the coast of Peru, in 2222 fathoms, temperature 35°.2 F., and dead valves near Cocos Island. So the presence of *L. moseleyi* in the cold waters of Cape Horn would not be extraordinary, while if *L. uva* is also present in that region one would expect to find it in the comparatively shallow water, which is somewhat warmer than that of the deeps. I have not seen any specimens of *L. uva* from south of Peru.

Liothyrina moseleyi Davidson.

U. S. S. "Albatross," station 4656, in south latitude 6° 55′ and west longitude 83° 34′, in 2222 fathoms, mud, bottom temperature 35°.2 F. U. S. N. Mus. 110,744. Also (dead valves, probably of this species) at station 3370, in 134 fathoms, near Cocos Island, temperature 54°.8 F.

The original locality of this species was west of Kerguelen Island, "Challenger" expedition, station 148, in 210 fathoms, rocky bottom.

A specimen believed to be of the same species was obtained off Martinique, West Indies, in 169 fathoms, temperature 51° F. It was identified by Mr. Davidson as being his species.

Liothyrina clarkeana Dall.

Liothyrina clarkeana Dall, Proc. U. S. N. Mus., 1895, **17**, p. 718, pl. **31**, figs. 9, 10.

U. S. S. "Albatross," station 3362, Gulf of Panama, in 1175 fathoms, mud, bottom temperature 36°.8 F. U. S. N. Mus. 107,275. Also at station 4709, southwest of the Galapagos Islands, in 2035 fathoms, ooze, temperature 35° F.

A single specimen was obtained in each instance.

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[1] Zool. Anzeiger, Sept., 1906, **30**, p. 698.

Liothyrina wyvillii Davidson.

Terebratula wyvillii Davidson, Challenger Report, 1880, Zool., **1**, p. 27, pl. **2**, figs. 7–9.

"Challenger" station 299, off Valparaiso, in 2160 fathoms, bottom temperature (34° F.) 1°.1 C., and station 302, off the coast of Patagonia, in 1450 fathoms, temperature 1°.5 C. Also at various other localities in from 1035 to 2900 fathoms, and from latitude 42° 43′ south to 35° 22′ north.

U. S. S. "Albatross," station 4709, southwest of the Galapagos Islands, in 2035 fathoms, ooze, attached to manganese nodules, bottom temperature 35°.3 F. U. S. N. Mus. 110,745.

Several specimens, mostly broken by the nodules in the trawl net, were obtained. The brachia are small compared with those of the shallow-water species, but a small spiral median lobe and two lateral loops were found to be present.

Terebratellidae.

TEREBRATELLA D'Orbigny.

Terebratella dorsata Gmelin.

Anomia dorsata Gmelin, Syst. Nat., 1791, **6**, p. 3348.

Terebratella dorsata Davidson, Challenger Report, Zool., 1880, **1**, p. 44, pl. **4**. fig. 4; Fischer and Oehlert, Brach. Cap Horn, 1892, p. 20, pl. **9**, fig. 1–30; pl. **10**, fig. 1–30.

Terebratula patagonica Gould, Expl. Exp. shells, 1856, fig. 583.

Mission to Cape Horn, various localities in the Patagonian and Fuegian region in 8 to 120 fathoms, temperatures 6°.2 to 8°.2 C. (42°.7–46°.7 F.).

This is really a species of moderate depths, but occasionally lives at a depth exceeding 100 fathoms.

MAGELLANIA Bayle.

Magellania wyvillii Davidson.

Waldheimia wyvillii, Davidson, Challenger Report, Zool., 1880, **1**, p. 44, pl. **3**, fig. 13a–b.

"Challenger" station 299, off Valparaiso, in 2160 fathoms, ooze, bottom temperature 1°.1 C. (34° F.).

Only a single defective specimen was obtained, notable for its extremely thin and fragile shell.

MACANDREVIA King.

Macandrevia americana Dall.

Eudesia fontaineana Dall (not D'Orbigny), Proc. U. S. Nat. Mus., 1889, **12**, p 231.

Macandrevia americana Dall, Proc. U. S. Nat. Mus., 1895, **17**, p 721, pl **32**, figs. 1, 4, 7.

U. S. S. "Albatross," station 2783, off the west coast of Patagonia, Southern Chile, in 122 fathoms, mud, bottom temperature 48° F. U. S. N. Mus. 87,547. Also at station 3360, Gulf of Panama, in 1672 fathoms, sand, temperature 42° F.

Macandrevia diamantina DALL.

Macandrevia diamantina Dall, Proc. U. S. Nat. Mus., 1895, **17**, p. 723, pl. **30**, fig. 5; pl. **32**, figs. 3, 6.

U. S. S. "Albatross," station 3362, Gulf of Panama, in 1175 fathoms, mud; bottom temperature 36°.8 F.; also at station 4656, in 2222 fathoms mud, off Sechura Point, Peru, temperature 35°.2 F. U. S. N. Mus. 122,860.

Macandrevia craniella DALL.

Macandrevia craniella Dall, Proc. U. S. Nat. Mus., 1895, **17**, p. 722, pl. **30**, fig. 1.

U. S. S. "Albatross," station 3362, off Cocos Island, Gulf of Panama, in 1175 fathoms, mud, bottom temperature 36°.8 F. U. S. N. Mus. 122,858.

Only one specimen was obtained. It somewhat resembles *Waldheimia wyvillii* Davidson, but is larger, more solid, wants the medial septum in the dorsal valve, and differs in other minor details.

RECORD OF DREDGING AND TRAWLING STATIONS OF THE UNITED STATES FISH COMMISSION STEAMER "ALBATROSS" IN THE PANAMIC DISTRICT, FEBRUARY TO MAY, 1891.

Serial Number.	Date.	Time.	Position.		Temperatures.		Depth in Fathoms.	Character of Bottom.	Remarks.
			Latitude North.	Longitude West.	Surface.	Bottom.			
	1891.	h. m.	° ′ ″	° ′ ″	°	°			
	Feb. 22	8 0 P.M.	....	......	..	...	...	....	Surface tow-net.
3353	" 23	8 56 A.M.	7 6 15	80 34 0	73	39.0	695	gn. M.	
3354	" 23	1 25 P.M.	7 9 45	80 50 0	78	46.0	322	gn. M.	
3355	" 23	3 1 P.M.	7 12 20	80 55 0	81	54.1	182	bk. sh.	
3356	" 23	7 30 P.M.	7 9 30	81 8 30	83	40.1	546	sft. bl. M.	Surface tow-net. 15 miles from Mariato Point.
3357	" 24	6 17 A.M.	6 35 0	81 44 0	83	38.5	782	gn. S.	Surface tow-net.
3358	" 24	11 38 A.M.	6 30 0	81 44 0	83	40.2	555	gn. S.	
3359	" 24	2 4 P.M.	6 22 20	81 52 0	83	42.0	465	rky.	
3360	" 24	5 20 P.M.	6 17 0	82 5 0	83	36.4	1672	fne. bk. dk. gn. S.	Surface tow-net.
3361	" 25	7 33 A.M.	6 10 0	83 6 0	82	36.6	1471	gn. Oz.	
3362	" 26	7 20 A.M.	5 56 0	85 10 30	84	36.8	1175	gn. M. S. rky.	Intermediate net of Chun and Petersen.
3363	" 26	4 37 P.M.	5 43 0	85 50 0	83	37.5	978	wh. glob. Oz.	Surface tow-net.
3364	" 27	6 58 A.M.	5 30 0	86 8 30	81	38.0	902	yl. glob. Oz.	
3365	" 27	1 30 P.M.	5 31 0	86 31 0	85	37.0	1010	yl. glob. Oz.	Surface tow-net.
3366	" 27	8 4 P.M.	5 30 0	86 45 0	84	37.0	1067	yl. glob. Oz.	
3367	" 28	6 38 A.M.	5 31 30	86 52 30	82	57.1	100	rky.	
3368	" 28	7 21 A.M.	5 32 45	86 54 30	82	58.4	66	rky.	Surface tow-net.

3369	"	28	8 7 A.M.	5 32 45	86 55 20	82	62.2	52	Nullipore or rky.	
3370	"	28	10 3 A.M.	5 36 40	86 56 50	84	54.8	134	rks. & S.	At Cocos Island. Surface tow-net at night.
3371	March	1	7 49 A.M.	5 26 20	86 55 0	82	39.0	770	glob. Oz.	
3372	"	1	5 51 P.M.	4 40 0	86 11 20	84	38.8	761	gy. glob. Oz.	8 P.M. Surface tow-net.
3373	"	2	10 33 A.M.	4 2 0	84 58 0	82	36.6	1877	br. M. bk. Sp.	
3374	"	3	10 35 A.M.	2 35 0	83 53 0	80	36.4	1823	gn. Oz.	
3375	"	4	6 36 A.M.	2 34 0	82 29 0	77	36.6	1201	gy. glob. Oz.	Surface tow-net.
3376	"	4	4 27 P.M.	3 9 0	82 8 0	78	36.3	1132	gy. glob. Oz.	
3377	"	5	8 38 A.M.	3 56 0	81 40 15	77	38.0	764	M.	
3378	"	5	11 45 A.M.	3 58 20	81 36 0	78	55.9	112	brk. sh.	
3379	"	5	2 15 P.M.	3 59 40	81 35 0	78	. . .	52	rks.	
3380	"	5	4 51 P.M.	4 3 0	81 31 0	79	37.2	899	rks.	
3381	"	6	8 38 A.M.	4 56 0	80 52 30	77	35.8	1772	gn. M.	
3382	"	7	10 46 A.M.	6 21 0	80 41 0	75	35.8	1793	gn. M.	Submarine tow-net. 8.30 P.M., surface tow-net.
3383	"	8	6 51 A.M.	7 21 0	79 2 0	74	36.0	1832	gn. glob. Oz.	
3384	"	8	1 20 P.M.	7 31 30	79 14 0	74	42.0	458	gn. S.	
3385	"	8	3 7 P.M.	7 32 36	79 16 0	72	45.9	286	gn. M.	
3386	"	8	4 54 P.M.	7 33 12	79 17 15	73	48.0	242	fne. gy. S.	
3387	"	8	7 21 P.M.	7 40 0	79 17 50	74	56.4	127	fne. gy. S.	Surface tow-net.
3388	"	9	6 41 A.M.	7 6 0	79 48 0	73	36.2	1168	gn. glob. Oz.	Submarine tow-net.
3389	"	9	2 10 P.M.	7 16 45	79 56 30	74	48.8	210	gn. M.	
3390	"	9	4 25 P.M.	7 26 10	79 53 50	74	62.6	56	fne. gy. S.	
3391	"	9	7 15 P.M.	7 33 40	79 43 20	73	55.8	153	gn. M.	
3392	"	10	6 30 A.M.	7 5 30	79 40 0	73	36.4	1270	hard.	Rhabdamina bottom.
3393	"	10	1 21 P.M.	7 15 0	79 36 0	74	36.8	1020	gn. M.	
3394	"	10	5 43 P.M.	7 21 0	79 35 0	73	41.8	511	dk. gn. M.	
3395	"	11	2 20 P.M.	7 30 36	78 39 0	70	38.5	730	rky.	
3396	"	11	5 15 P.M.	7 32 0	78 36 30	70	47.4	259	hrd. gy. M. S.	

RECORD OF DREDGING AND TRAWLING STATIONS OF THE UNITED STATES FISH COMMISSION STEAMER "ALBATROSS" IN THE PANAMIC DISTRICT, FEBRUARY TO MAY, 1891. — *Continued.*

Serial Number.	Date.	Time.	Position.		Temperature.		Depths in Fathoms.	Character of Bottom.	Remarks.
			Latitude North.	Longitude West.	Surface.	Bottom.			
	1891.	h. m.	° ′ ″	° ′ ″	°	°			
3397	March 11	6 32 P.M.	7 33 0	78 34 20	71	57.3	85	stf. gn. M. brk. sh.	Surface tow-net.
3398	" 23	3 16 P.M.	1 7 0	80 21 0	84	36.0	1573	gn. Oz.	Surface tow-net, off Galera Point.
3399	" 24	6 37 A.M.	1 7 0	81 4 0	80	36.0	1740	gn. Oz.	Surface tow-net.
			South.						
3400	" 27	6 10 A.M.	0 36 0	86 46 0	81	36.0	1322	lt. gy. glob. Oz.	Surface tow-net.
3401	" 28	4 45 A.M.	0 59 0	88 58 30	82	44.0	395	glob. Oz.	
3402	" 28	7 13 A.M.	0 57 30	89 3 30	82	42.3	421	R. glob. Oz.	
3403	" 28	10 19 A.M.	0 58 30	89 17 0	82	43.3	384	fne. gy. S. bk. sp.	
3404	" 28	1 16 P.M.	1 3 0	89 28 0	83	43.2	385	R.	Tangles.
3405	" 28	3 42 P.M.	0 57 0	89 38 0	83	60.0	53	R. Co. Sh.	
3406	April 3	6 47 A.M.	0 16 0	90 21 30	81	41.3	551	R.	
3407	" 3	10 48 A.M.	0 4 0	90 24 30	81	37.2	885	glob. Oz.	Tangles.
			North.						
3408	" 3	4 7 P.M.	0 12 30	90 32 30	83	39.5	684	glob. Oz.	Tangles.
3409	" 3	7 24 P.M.	0 18 40	90 34 0	82	42.3	327	bk. S.	Tangles. Surface tow-net. Off Bindloe Island, 4 miles west.
3410	" 3	8 48 P.M.	0 19 0	90 34 0	82	44.2	331	bk. S.	
3411	" 4	7 35 A.M.	0 54 0	91 9 0	82	36.2	1189	yl. glob. Oz.	
3412	" 4	6 11 P.M.	1 23 0	91 43 0	82	38.0	918	R.	9 P.M., surface tow-net, 5 miles off Wenman Island.

3413	"	5	8 34 A.M.	2 34 0	92 6 0	82	36.0	1360	glob. Oz. dk. sp.	At noon, surface tow-net.
3414	"	8	11 14 A.M.	10 14 0	96 28 0	82	35.8	2232	gn. M.	Submarine tow-net and surface tow-net.
3415	"	10	9 39 A.M.	14 46 0	98 40 0	82	36.0	1879	br. M. glob. Oz.	
3416	"	11	9 46 A.M.	16 32 30	99 42 40	81	40.5	419	fne. br. M.	
3417	"	11	11 44 A.M.	16 32 0	99 48 0	82	40.6	493	gn. M.	
3418	"	11	2 57 A.M.	16 33 0	99 52 30	82	39.0	660	br. S. bk. sp.	
3419	"	11	5 59 P.M.	16 34 30	100 3 0	81	39.6	772	gn. M. bk. sp.	Surface tow-net.
3420	"	12	7 48 A.M.	16 46 0	100 8 20	82	39.6	664	dk. gn. M.	
3421	"	12	11 32 A.M.	16 47 20	100 0 10	82	42.9	388	dk. gn. M.	
3422	"	12	12 35 P.M.	16 47 30	99 59 30	83	53.5	141	gn. M.	
3423	"	12	1 31 P.M.	16 47 30	99 59 20	83	56.0	94	gn. M.	
3424	"	18	11 18 A.M.	21 15 0	106 23 0	76	38.0	676	gy. S. bk. Sp. glob.	
3425	"	18	2 14 P.M.	21 19 0	106 24 0	76	39.0	680	gn. M. & S.	
3426	"	18	3 45 P.M.	21 21 0	106 25 0	76	51.2	146	rky.	
3427	"	18	4 3 P.M.	21 22 15	106 25 0	75	51.2	80	rky.	Tangles.
3428	"	18	6 40 P.M.	21 36 30	106 25 0	76	48.1	238	dk. gy. S. glob.	
3429	"	19	5 39 A.M.	22 30 30	107 1 0	73	37.0	919	gn. M. glob. Oz.	
3430	"	19	3 27 P.M.	23 16 0	107 31 0	73	37.9	852	bk. S.	
3431	"	20	6 33 A.M.	23 59 0	108 40 0	70	37.0	995	lt. br. M. glob.	
3432	"	20	2 38 P.M.	24 22 30	109 3 20	70	37.8	1421	br. M. bk. sp.	
3433	"	21	6 34 A.M.	25 26 15	109 48 0	69	36.5	1218	br. M. bk. sp.	Surface tow-net.
3434	"	21	10 14 A.M.	25 29 30	109 48 0	70	36.4	1588	br. M. bk. sp.	
3435	"	22	8 56 A.M.	26 48 0	110 45 20	70	37.3	859	br. M. bk. sp.	
3436	"	22	3 10 P.M.	27 34 0	110 53 40	72	37.2	905	br. M. bk. sp.	Submarine tow-net and surface tow-net.
3437	"	23	5 4 A.M.	......	......	70	40.0	628	br. M. bk. sp.	Submarine tow-net dragged on the bottom. About 50 miles south of Guaymas.

RECORD OF PELAGIC STATIONS OF THE UNITED STATES FISH COMMISSION STEAMER "ALBATROSS" BETWEEN SAN FRANCISCO, CAL., AND PANAMA DURING OCTOBER, 1904.

Serial Number.	Date.	Time.	Position.		Temperature at Surface.	Depth in Fathoms at nearest Sounding.	Time in Minutes.	Distance from Land.	Remarks.
			Lat. North.	Long. West.					
U.S.F.C	1904.	h. m.	° ′	° ′	°		h. m.	miles.	
4567	Oct. 6	1 30 P.M.	37 25	122 26	60–63	28	3 30	4.25	Pump filter No. 20 silk. Started at 10 A.M., at 37° 50′ N. and 122° 30′ W.
4568	" 6	5 30 P.M.	36 45	122 02	60–63	486	4 00	10.0	Pump filter. Started at 1.30 P.M., at 37° 25′ N. and 122° 26′ W.
4569	" 6–7	6 00 A.M.	34 45	120 15	60–63	38	12 30	11.5	Pump filter No. 20. Started at 5.30 P.M., Oct. 6, at 36° 45′ N. and 122° 02′ W.
4570	" 7	9 00 A.M.	34 20	120 20	63–64	187	3 00	6.8	Pump filter. Started at 6 A.M., at 34° 45′ N. and 120° 15′ W.
4571	" 7	4 23 P.M.	33 40	119 35	71	825	18 00	18.3	Surface haul. Vertical haul. Started at 3.04 P.M.
4572	" 7	5 30 P.M.	33 30	119 25	64–66	899	8 30	13.4	Pump filter. Started at 9 A.M., at 34° 20′ N. and 120° 20′ W.
4573	" 7–8	7 00 A.M.	31 35	118 10	64–67	1076	13 30	62.6	Pump filter. Started at 5.30 P.M., at 33° 30′ N. and 119° 25′ W.
4574	" 8	3 45 P.M.	30 35	117 15	69	330	42 00	69.3	Vertical hauls.
4575	" 8	5 30 P.M.	30 15	117 10	67–70	1466	10 30	56.0	Pump filter.
4576	" 8	8 51 P.M.	29 52	116 56	69	1466	21 00	55.2	Surface haul.
4577	" 8–9	7 00 A.M.	28 25	115 55	66–70	1279	13 30	17.3	Pump filter. Started at 5.30 P.M., Oct. 8, at 30° 15′ N. and 117° 10′ W.

4578	"	9	7 00 P.M.	27 02	114 40	70–71	543	12 00	14.4	Pump filter. Started at 7.00 A.M. at 28° 25′ N. and 115° 55′ W.
4579	"	9–10	7 00 A.M.	25 20	113 13	70–72	75	12 00	45.0	Pump filter. Started at 7.00 P.M., Oct. 9, at 27° 02′ N. and 114° 40′ W.
4580	"	10	11 20 A.M.	24 55	112 45	76	19	20 00	14.4	Vertical hauls.
4581	"	10	7 00 P.M.	24 15	111 52	72–77	40	12 00	5.1	Pump filter. Started at 7 A.M., at 25° 20′ W. and 113° 13′ N.
4582	"	10–11	7 00 A.M.	23 12	110 32	77–82	323	12 00	19.5	Pump filter No. 20. Started at 24° 15′ N. and 111° 52′ W.
4583	"	11	10 30 A.M.	22 45	110 5	83	1048	23 00	8.2	Vertical hauls.
4584	"	11	7 00 P.M.	22 05	109 10	81–87	1624	12 00	62.3	Pump filter. Started at 7 A.M., at 23° 12′ N. and 110° 32′ W.
4585	"	11–12	7 00 A.M.	21 00	107 37	80–83	1747	12 00	64.3	Pump filter. Started at 7 P.M., Oct. 11, at 22° 05′ N. and 109° 10′ W.
4586	"	12	7 30 P.M.	19 52	106 22	83	1923	9 30	28.7	Pump filter. Started at 10 A.M., at 20° 42′ N. and 107° 25′ W.
4587	"	12	10 39 A.M.	20 42	107 25	82	1885	24 00	58.0	Vertical hauls.
4588	"	12	8 50 P.M.	19 52	106 22	81–83	1923	20 00	28.6	Surface haul.
4589	"	12–13	10 30 A.M.	18 50	104 50	82–83	1038	13 00	21.8	Pump filter. Started at 19° 52′ N. and 106° 22′ W., at 7.30 P.M., Oct. 12.
4590	"	13	10 40 A.M.	18 50	104 50	82–83	1038	22 00	21.8	Vertical hauls.
4591	"	13	7 00 P.M.	18 20	103 40	83–87	30	8 30	4.5	Pump filter No. 20. Started at 10.30 A.M., at 18° 50′ N. and 104° 50′ W.
4592	"	13	7 54 P.M.	18 20	103 40	84	30	24 00	4.5	Surface hauls.
4593	"	14	7 00 A.M.	17 25	101 50	82–85	627	12 00	19.0	Pump filter. Started at 7.00 P.M., Oct. 13, at 18° 20′ N. and 104° 40′ W.

RECORD OF PELAGIC STATIONS, ETC., — *Continued.*

Serial Number.	Date.	Time.	Position.		Temperature at Surface.	Depth in Fathoms at nearest Sounding.	Time in Minutes.	Distance from Land.	Remarks.
			Lat. North.	Long. West.					
U. S. F. C.	1904.	h. m.	° ′	° ′	°		h. m.	miles.	
4594	Oct. 14	10 30 A.M.	17 20	101 32	84	627	30 00	16.0	Vertical hauls.
4595	" 14	7 00 A.M.	16 47	100 27	84–85	838	9 00	14.4	Pump filter. Started at 10 A.M., at 17° 26′ N. and 101° 32′ W.
4596	" 14	7 24 P.M.	16 47	100 27	84	838	24 00	14.4	Surface haul.
4597	" 15	7 00 A.M.	16 10	98 37	81–84	30	12 00	7.1	Pump filter. Started at 7 P.M., Oct. 14, at 16° 47′ N. and 100° 27′ W.
4598	" 15	10 35 A.M.	15 58	98 13	84	99	30 00	4.5	Surface haul.
4599	" 15	7 00 P.M.	15 36	97 00	80–85	160	12 00	5.3	Pump filter. Started at 7.00 A.M., at 16° 10′ N. and 98° 37′ W.
4600	" 15	7 25 P.M.	15 36	97 00	82	160	25 00	5.3	Surface haul. Started at 7.00 P.M.
4601	" 16	7 00 A.M.	14 58	95 17	81–83	120	12 00	61.2	Pump filter. Started at 7.00 P.M., Oct. 15, at 15° 36′ N. and 97° 00′ W.
4602	" 16	7 00 P.M.	13 37	93 52	79–82	2166	12 00	103.2	Pump filter. Started at 7.00 A.M. at 14° 58′ N. and 95° 17′ W.
4603	" 17	7 30 A.M.	12 30	92 30	81–83	2166	12 30	110.0	Pump filter. Started at 7.00 P.M., Oct. 16, at 13° 37′ N. and 93° 52′ W.
4604	" 17	11 30 A.M.	12 21	92 13	84	2166	30 00	110.1	Surface haul.
4605	" 17	1 30 P.M.	12 21	92 13	85	2166	30 00	110.1	Vertical hauls. Started at 1 P.M.
4606	" 17	7 00 P.M.	12 00	91 30	81–83	2500	11 30	116.0	Pump filter No. 20. Started at 7.30 A.M., at 12° 30′ N. and 92° 30′ W.

4607	" 17	7 22 P.M.	12 00	91 30	83	2500	22 00	116.0	Surface haul.
4608	" 18	8 00 A.M.	11 15	89 48	82–83	2052	13 00	130.4	Pump filter. Started at 7 P.M., Oct. 17, at 12° 00′ N. and 91° 30′ W.
4609	" 18	10 30 A.M.	11 05	89 35	81	1970	30 00	132.2	Vertical hauls.
4610	" 18	7 00 P.M.	10 33	88 30	78–83	1792	11 00	135.0	Pump filter. Started at 8.00 A.M., at 11° 15′ N. and 89° 48′ W.
4611	" 18	7 23 P.M.	10 33	88 30	78	1792	23 00	135.0	Surface haul.
4612	" 19	7 00 A.M.	9 50	86 40	78–80	1833	12 00	66.7	Pump filter. Started at 7.00 P.M., Oct. 18, at 10° 33′ N. and 88° 30′ W.
4613	" 19	10 30 A.M.	9 45	86 20	80	1833	30 00	54.4	Vertical hauls. Started at 10 A.M.,
4614	" 19	7 00 P.M.	9 7	85 11	79–82	1708	12 00	26.2	Pump filter. 9° 50′ N. and 86° 40′ W.
4615	" 19	7 20 P.M.	9 7	85 11	80	1708	20 00	26.2	Surface haul. Started at 7 P.M.
4616	" 20	7 00 A.M.	8 10	83 33	79–80	956	12 00	17.2	Pump filter. Started at 7 P.M., Oct. 19, at 9° 7′ N. and 85° 11′ W.
4617	" 20	4 25 P.M.	7 45	82 25	78	1185	25 00	10.0	Vertical haul. Started at 4.00 P.M.
4618	" 20	7 00 P.M.	7 15	82 8	77–80	792	12 00	12.8	Pump filter. Started at 7.00 A. M., at 9° 7′ N. and 82° 11′ W.
4619	" 20	7 20 P.M.	7 15	82 8	79	792	20 00	12.8	Surface haul. Started at 7.00 P.M.
4620	" 21	8 00 A.M.	6 45	81 47	78–79	782	13 00	27.0	Pump filter. Started at 7.00 P.M., Oct. 20, at 7° 15′ N. and 82° 8′ W.
4621	" 21	10 26 A.M.	6 36	81 44	79	581	36 00	36.4	Vertical haul.
4622	" 21	12 50 P.M.	6 31	81 44	81	581	74 00	40.8	Vertical haul.
4623	" 21	7 00 P.M.	6 58	80 46	78–81	592	11 00	12.8	Pump filter. Started at 8 A.M., at 6° 45′ N. and 81° 47′ W.
4624	" 21	7 30 P.M.	6 58	80 46	79	592	30 00	12.8	Surface haul.
4625	" 22	7 00 A.M.	8 00	79 33	79–80	75	12 00	37.6	Pump filter. Started at 7 P.M., Oct. 21, at 6° 58′ N. and 80° 46′ W.
4626	" 22	7 00 P.M.	8 55	79 32	80–84	5	12 00	0.7	Pump filter. Started at 7 A.M., at 8° 00′ N. and 79° 33′ W.

RECORD OF DREDGING, TRAWLING, AND PELAGIC STATIONS OCCUPIED BY THE UNITED STATES FISH COMMISSION STEAMER "ALBATROSS" IN THE EASTERN TROPICAL PACIFIC FROM NOVEMBER, 1904, TO MARCH, 1905.

Serial Number.	Date.		Time.		Position.		Temperatures.		Depth in Fathoms.	Character of Bottom.	Remarks.
					Latitude North.	Longitude West.	Surface.	Bottom.			
	1904.		h. m.		° ′	° ′	°	°			
4627–4640 Panama to Galapagos Islands.											
4627	Nov.	2	7	P.M.	7 21.3	79 55.8	81.5	...	....	....	Surface haul.
4628	"	2	9	P.M.	7 15	80 5.5	80–83	...	....	....	Pump filter.
4629	"	3	8†	A.M.	6 52	81 42.5	81	40.5	556	gn. S., lrge. glob.	Pump filter. Trawling for the green sand collected in 1891.
4630	"	3	8	A.M.	6 53	81 42.5	81				
4631	"	3	1	P.M.	6 26	81 49	82	38.0	774	gn. S.	Pump filter. Trawling for the green sand collected in 1891.
4632	"	3	8‡	P.M.	5 48.5	82 16.3	79–83	...	....	....	Pump filter.
4504*	"	3	10	P.M.	5 36	82 28	80	36.4	1885	fine gn. M.	Trawl.
4633	"	4	8	A.M.	4 40	83 24.4	79–80	...	....	....	Pump filter.
4634	"	4	10 30	A.M.	4 35.4	83 32.3	80	35.9	1729	....	Trawl. Towed at 300 fathoms.
4635	"	4	8	P.M.	3 52.5	84 14.3	79	...	....	....	Surface haul; pump filter.

4505*	"	5	3	A.M.	3 11.6	84 57.4	78	36.4	1705	gn. M., glob.	
4636	"	5	8	A.M.	2 44.5	85 23.5	78	. . .	. . . .	. . . .	Pump filter.§
4637	"	5	9	P.M.	1 31	86 32	76	no record	1541	sml. & lrge. glob., lt. gn. glob. Oz.	Globigerinae similar to those found in pump filter on surface (8 A.M.). Thermometer did not trip. Towed at 300 fathoms and vertical haul to surface.
4638	"	6	7	A.M.	0 27	87 13	75	no record	1450	lt. gn. glob. Oz.	Thermometer did not trip. At Stn. 4638 also made a surface haul and towed with open net at 300 fathoms and vertically to surface. Pump filter.
					Latitude South.						
4639	"	6	1	P.M.	0 4	87 39.5	76	35.4	1418	lt. gy. glob. Oz., br. M.	Surface haul poor.
4506*	"	6	5	P.M.	0 21	87 57.5	75	no record	1433	gy. glob. Oz., br. M.	
4640	"	6	8	P.M.	0 39.4	88 11	75	37.4	1061	no sample	Pump filter, and extraordinarily rich surface haul, with a large number of pelagic fishes.

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* Hydrographic Stations where soundings alone were made.

† Stations occupied at 8 A.M. are usually trawling stations at which temperature serials were also taken and intermediate tows at 300 fathoms and to the surface.

‡ At 8 P.M. a surface haul was usually made daily.

§ When not mentioned to the contrary, the pump filter was run each day.

RECORD OF DREDGING, TRAWLING, AND PELAGIC STATIONS. — *Continued.*

Serial Number	Date.	Time.	Position.		Temperature.		Depth in Fathoms.	Character of Bottom.	Remarks.
			Latitude South.	Longitude West.	Surface.	Bottom.			
	1904.	h. m.	° ′	° ′	°	°			
4641–4644 Southeast Face of Galapagos Islands.									
4641	Nov. 7	8 A.M.	1 34.4	89 30.2	74	39.5	633	lt. gy. glob. Oz.	Trawl haul, 10 miles from Hood Island, Galapagos.
4642	" 7	10 30 A.M.	1 30.5	89 35	74	48.6	300	brk. Sh. & glob.	5 miles from southeast end of Hood Island; Tangles.
4643	" 7	1 30 P.M.	1 28.7	89 48.5	74	67.2	100	brk. Sh. & glob.	About 4½ miles southwest by south from the west end of Hood; Tangles and Trawl.
4644	" 7	8 30 P.M.	2 13.3	89 42.2	72	35.4	1752	fine lt. gy. glob. Oz.	Surface haul with many fishes; pump filter.
4645–4654 Galapagos to Aguja Point.									
4645	Nov. 8	8 00 A.M.	3 37.6	89 43.1	70	36.0	1955	fine lt. gy. glob. Oz.	Trawl came up empty. Pump filter.
4646	" 8	7 00 P.M.	4 1.6	89 16.3	72	35.4	2058	fine lt. gy. glob. Oz. and br. M.	Towed 20 minutes with open net at 300 fathoms and vertically to surface.

4647	"	9	8 00 A.M.	4 33	87 42.5	70	35.5	2005	very lt. gy. glob. Oz.; large glob., br. M.	Trawl, magnificent haul of Holothurians, open net tow to surface from 800 fathoms.
4648	"	9	7 00 P.M.	4 43	87 7.5	71	...	....	....	Surface haul and towed 20 minutes at 300 fathoms and vertically to surface. Swarm of Cytaeis on surface.
4649	"	10	8 00 A.M.	5 17	85 19.5	70	35.4	2235	stky. gy. M., very few glob.	Trawl haul. Octacnemus in the trawl. Pump filter. Open net tow from 800 fathoms to surface.
4650	"	10	7 00 P.M.	5 22	84 39	71	...	....	....	Surface haul; mass of Salpae; towed 20 minutes at 300 fathoms and up to surface.
4651	"	11	8 00 A.M.	5 41.7	82 59.7	66	35.4	2222	stky. fine gy. S.; trace of shore M.	Trawl, fine lot of silicious sponges; net towed open at 800 fathoms and to surface.
4652	"	11	7 00 P.M.	5 44.7	82 39.5	66	...	....	....	Surface haul. Towed 20 min. at 400 fathoms and to surface. Towed 20 min. at 200 fathoms and to surface (Dissoma). Towed 20 min. at 100 fathoms and to surface.

RECORD OF DREDGING, TRAWLING, AND PELAGIC STATIONS. — *Continued.*

Serial Number.	Date	Time.	Position.		Temperatures.		Depth in Fathoms.	Character of Bottom.	Remarks.
			Latitude South.	Longitude West.	Surface.	Bottom.			
	1904	h. m.	° ′	° ′	°	°			
4507*	Nov. 12	7 00 A.M.	5 43.6	81 43.8	64	34.9	2312	fine stky. blue M., shore M., Pumice.	Trawl, much vegetable matter 17 miles from land, Nonuna Pt.
4653	" 12	10 27 A.M.	5 47	81 24	65	41.3	536	dk. br. gy. shr. M., many Diatoms.	Trawl.
4508*	" 12	1 00 P.M.	5 46.5	81 26.9	65	38.5	685	dk. gn. shore M.	
4654	" 12	1 50 P.M.	5 46	81 31.9	65	37.3	1036	dk. br. M., veg. Mat., many Diatoms.	Trawl.
4655–4661. Line from Aguja Point towards the outer Western Edge of the Chili-Peruvian Stream.									
4655	Nov. 12	7 P.M.	5 57.5	80 50	65	. . .	. . . .	. . . .	Surface haul. Towed at 400 fathoms, 20 min. and to surface; Pump filter.
4656	" 13	8 A.M.	6 54.6	83 34.3	69	35.2	2222	fine gn. M. mxd. with gy. Oz., min. part. Sponge spic., many Diatoms.	Trawl; Octacnemus in trawl.
4657	" 13	7 00 P.M.	7 12.5	84 9	69	. . .	. . . .	. . . .	Surface haul. Towed at 300 fathoms and vertically to surface.

4658	" 14	8 00 A.M.	8 29.5	85 35.6	70	35.3	2370	fine gn. M., Mang. nod.; Rad. Oz.	Trawl full of Manganese nodules 3 to 5″ in diameter. Sharks' teeth. Cetacean earbones. Towed with Tanner closing net at 300 fathoms, 20 minutes, failed to close.
4659	" 14	7 00 P.M.	8 54.5	86 5.5	69	...	....	....	Surface haul and towed 20 min. at 300 fathoms and vertically to surface.
4660	" 15	8 00 A.M.	9 55.6	87 30	69	35.4	2425	fine br. M.; Mang. nod.; Rad., a few Diatoms; Sponge spic.	Trawl, pump filter.
4661	" 15	7 00 P.M.	10 17	88 2	69	...	....	....	Surface haul. Salpa soup. Towed at 300 fathoms, 20 min. and to surface.
4662–4669. FROM THE WESTERN PART OF THE PERUVIAN CURRENT TO THE WESTERN EDGE OF MILNE-EDWARDS DEEP.									
4662	Nov. 16	8 00 A.M.	11 13.8	89 35	69	35.2	2439	br. Rad. Oz., Mang. nod.	Pump filter; towed net at 800 fathoms and to surface.
4663	" 16	7 00 P.M.	11 20.3	88 55.2	69	...	....	....	Pump filter, surface haul; Salpa soup. Towed at 300 and to surface. Yellow Pelagonemertes.

* Hydrographic Stations.

RECORD OF DREDGING, TRAWLING, AND PELAGIC STATIONS. — *Continued.*

Serial Number.	Date.	Time.	Position.		Temperatures.		Depth in Fathoms.	Character of Bottom.	Remarks.
			Latitude South.	Longitude West.	Surface.	Bottom.			
	1904.	h. m.	° ′	° ′	°	°			
4664	Nov. 17	8 00 A.M.	11 30.3	87 19	68	. . .	. . . .	. . . .	Pump filter, surface haul, towed at 300 fathoms and to surface, Tanner closing net at 400 fathoms.
4665	" 17	7 00 P.M.	11 45	86 5.2	68	. . .	. . . .	. . . .	Surface haul, poor tow at 300 and vertical to surface. Pump filter.
4666	" 18	8 00 A.M.	11 55.5	84 20.3	67	34.9	2600	lt. gy. Oz., floc. débris, few Mang. nod., Cetacean ear-bones.	Trawl, angular fragments of rocks. Pump filter.
4667	" 18	7 00 P.M.	11 59.5	83 40.4	68	. . .	. . . .	. . . .	Surface haul. Towed at 300 fathoms and to surface.
4668	" 19	8 00 A.M.	12 9.3	81 45.2	67	no record	2620	fine gy. Oz., few Diatoms & Rad., glob.	Tanner net towed at 300 fathoms, 20 minutes.
4669	" 19	7 00 P.M.	12 12.7	80 25.6	67	. . .	. . . .	. . . .	Surface haul. Tow at 300 fathoms and to surface. Pelagonemertes.

4670–4675 FROM THE WESTERN EDGE OF MILNE-EDWARDS DEEP OFF CALLAO.

4670	Nov. 20	8 00 A.M.	12 8.7	79 2.4	66	35.4	3209	sft. lt. br. M.	Trawl. Serial temp. and towed net at 800 fathoms to surface.
4671	" 20	7 00 P.M.	12 6.9	78 28.2	66	35.4	1490	fine gn. clay; infus. earth full of Diatoms.	Water of late discolored by Diatoms. Surface haul and tow at 300 fathoms to surface. Pump filter.
4672	" 21	7 00 A.M.	13 11.6	78 18.3	65	35.2	2845	similar to above	Trawl. Fine haul of Holothurians. Tanner net tow at 400. Pump filter.
4673	" 21	7 00 P.M.	12 30.5	77 49.4	67	42.5	458	rky.	Surface haul, and tow at 300 fms.
4509*	" 22	7 00 A.M.	12 26.6	78 34.5	67	35.2	1949	fine dk. gn. M., many Diatoms.	Pump filter.
4674	" 22	9 00 A.M.	12 14.4	78 43.4	68	35.1	2338	fine dk. gn. M., Sponge spic.; few Diat. & few Rad., Diat. Oz. in mud-bag.	Large angular fragments of rock in trawl.
4675	" 22	7 00 P.M.	12 54.0	78 33.0	68	no record	3120	fn. dk. gn. M., floc. organic matter, Diat. débris, Silicious infus. earth.	Surface haul tow at 30 fathoms and to surface.

* Hydrographic Station.

RECORD OF DREDGING, TRAWLING, AND PELAGIC STATIONS. — *Continued.*

Serial Number.	Date.	Time.	Position.		Temperature.		Depth in Fathoms.	Character of Bottom.	Remarks.
			Latitude South.	Longitude West.	Surface.	Bottom.			
	1904.	h. m.	° ′	° ′	°	°			
4510*–4514*, 4676–4693 Callao to Easter Island.									
4510*	Dec. 4	7 00 P.M.	13 48.2	80 13.0	70	35.2	2543	fine lt. gy. clay Oz; floc. mat.; few Rad., Sponge spic.; Diat. Oz.	
4676	" 5	8 00 A.M.	14 28.9	81 24	69	35.4	2714	fine dk. br. Oz., Diat. Rad. Mang. nod.	Pump filter every A.M. at 8. Lost trawl frame and bag; serial temp. and tow at 300 fms.
4677	" 5	7 00 P.M.	14 37.5	81 41	68	. . .	. . . .	. . . .	Poor surface haul.
4511*	" 6	8 00 A.M.	15 39	83 27.4	69	35.2	2620	lt. br. Rad. Oz.; Rad. filled with M., no Diat.	
4678	" 6	7 30 P.M.	16 31.2	85 3.8	68	. . .	. . . .	. . . .	Surface haul very poor.
4679	" 7	8 00 A.M.	17 26.4	68 46.5	69	35.3	2485	lt. br. stky. Oz., Sponge spic., few Rad. or glob.	Tow at 300 fathoms. Water has been a most intense ultramarine to-day.

4680	“ 7	7 00 P.M.	17 55	87 42	68	...	....	....	Very little in tangles. Very fine surface haul. Cymbulia soup.
4681	“ 8	8 00 A.M.	18 47.1	89 26	68	35.4	2395	choc. br. clay, Mang. nod., few glob., few Rad.	Tow at 300 fathoms, serial temp.; trawl came back torn to pieces; a few manganese nodules left in bag; must have been too heavy a load.
4682	“ 8	7 30 P.M.	19 7.6	90 10.6	69	...	....	....	Surface haul; Cymbulia soup again.
4683	“ 9	8 00 A.M.	20 2.4	91 52.5	70	35.2	2385	dk. choc. col. clay, no Diat., very few glob. Mang. nod.	Serial temp., tow at 300 fathoms.
4684	“ 9	8 00 A.M.	20 40.3	93 19.2	71	...	....	....	Poor surface haul.
4685	“ 10	8 00 A.M.	21 36.2	94 56	72	35.3	2205	few Rad., a gd. many glob., dk. br. clay, no Diat., Orbulinae partly decomposed.	Tow at 300 fathoms and to surface; very poor haul. Serial temperature. Trawl haul; small trawl came up with 1½ tons of manganese nodules, very little animal life.
4686	“ 10	8 00 A.M.	22 2.2	95 52	71	...	....	....	Very poor surface haul.
4687	“ 11	8 00 A.M.	22 49.5	97 30.6	73	35.4	2184	dk. choc. col. clay, few more glob., few Rad., very few Sponge spic.	Tow at 300 fathoms, very poor. Tow at 2125 fathoms; nothing not taken before; very little in net, not more than in 300 fms. haul. Surface haul very poor here, out of current. 1260 miles from Callao and 500 from Sala y Gomez.

* Hydrographic Stations.

RECORD OF DREDGING, TRAWLING, AND PELAGIC STATIONS. — *Continued.*

Serial Number.	Date.	Time.	Position.		Temperatures.		Depth in Fathoms.	Character of Bottom.	Remarks.
			Latitude South.	Longitude West.	Surface.	Bottom.			
	1904.	h.m.	° ′	° ′	°	°			
4688	Dec. 11	8 00 A.M.	23 17.2	98 37.5	72	...	....	....	Surface haul very poor.
4689	" 12	8 00 A.M.	24 5	100 20	72	35.4	2185	dk. br. choc. clay, mrkd. incr. in glob., few Rad.	Tow at 300 fathoms, extremely poor haul. Serial temperatures.
4690	" 12	8 00 P.M.	24 45	101 45	73	...	....	....	Surface haul extremely poor.
4691	" 13	8 00 A.M.	25 27.3	103 29.3	73	35.3	1939	lt. yl. br. glob. Oz., few Rad., Sponge spic.	Tow at 300 fathoms; very poorest haul of all; trawl came up torn, with lot of angular fragments of volcanic rocks, pumice, and manganese nodules.
4692	" 13	8 00 P.M.	25 40.4	104 1.3	72	...	....	....	Nothing in surface haul.
4512*	" 14	8 00 A.M.	26 17.3	105 25.2	71	36.4	885	rky.	Off Sala y Gomez. Did not dare to trawl.
4693	" 14	11 00 A.M.	26 30.1	105 45.2	73	35.4	1142	rky., fine glob. from mudbag of trawl. Lava rk. & Mang. nod.	Sharks' teeth and cetacean earbones in trawl.
4513*	" 15	2 00 A.M.	26 50	107 30	71	35.4	1696	rky., no bot. spec.	
4514*	" 15	1 00 P.M.	27 1.6	108 56	74	35.4	1552	yl. clay, Mang. nod., few glob. & Rad.	Anchored in Cook Bay, Easter Id., 5.30 P.M.

4515*–4518*, 4694–4716 EASTER ISLAND TO CHATHAM ISLAND, GALAPAGOS.

4515*	Dec. 22	11 00 A.M.	26 58.7	109 20.3	72	35.5	1145	fine vol. S., few glob., Sponge spic.	5 miles off N. Pt. of Easter Id.
4516*	" 22	12 30 P.M.	26 54.8	109 16.4	74	35.4	1627	fine vol. S., Obsidian fgt., many glob.	10 miles off N. Pt. of Easter Id.
4517*	" 22	1 30 P.M.	26 50.9	109 12.5	74	35.4	1723	lt. br. Oz., many glob. Orbulina, a few Rad., vol. part.	15 miles off N. Pt. of Easter Id.; serial temperatures.
4518*	" 22	3 30 P.M.	26 47.3	109 9.3	75	35.3	1770	fine lt. br. Oz., many lrge. & sml. glob., Sponge spic., few Rad.	20 miles, off Easter Id., too rough to trawl.
4694	" 22	8 00 P.M.	26 34	108 57.3	72	. . .	. . . .	. . . .	Surface haul fair; very many Radiolarian colonies.
4695	" 23	8 00 A.M.	25 22.4	107 45	74	. . .	2020	in mudbag fine lt. br. Oz., very many glob., few Rad.	Lost thermom. and 90 fms. wire. Trawl haul, very little in bag. Manganese nodules, sharks' teeth.
4696	" 23	8 00 P.M.	24 40.3	107 5.3	74	. . .	. . . .	. . . .	Very poor surface haul.
4697	" 24	8 00 A.M.	23 24.4	106 2.2	75	35.5	2188	dk. br. choc. clay, few Rad., very few glob., fine min. part.	Tow at 300 very poor. Trawl tripped, probably from load of manganese nodules.
4698	" 24	8 00 P.M.	22 50.4	105 31.7	75	. . .	. . . .	. . . .	Wretchedly poor surface haul.

* Hydrographic Stations.

RECORD OF DREDGING, TRAWLING, AND PELAGIC STATIONS. — *Continued.*

Serial Number.	Date.	Time.	Position.		Temperature.		Depth in Fathoms.	Character of Bottom.	Remarks.
			Latitude South.	Longitude West.	Surface.	Bottom.			
	1904.	h. m.	° ′	° ′	°	°			
4699	Dec. 25	8 00 A.M.	21 39.5	104 29.8	75	35.5	2168	dk. br. choc. clay, very few Rad., arenaceous Foram.	Tow at 300 fathoms; very poor haul.
4700	" 25	8 00 P.M.	20 28.8	103 26.3	74	...	....	....	Surface haul, very marked improvement in catch; getting into trade wind region.
4701	" 26	8 00 A.M.	19 11.5	102 24	72	35.3	2265	dk. br. choc. clay, sharks' teeth, earbones, Mang. nod., very few glob. & Rad.	Tow 300 fathoms; very much better haul, more like those half way from Callao to Easter Id., poor trawl haul, bottom still very barren. Serial temperatures.
4702	" 26	8 00 P.M.	18 39.5	102	73	...	....	....	Surface haul very poor, some increase in the fine stuff in the water.
4703	" 27	8 00 A.M.	17 18.6	100 52.3	73	35.3	2228	dk. choc. col. Oz., some glob.	Tow at 300 fathoms, hauls continue poor, a few more Copepods. Trawl obtained nothing; barren bottom.

4704	" 27	8 00 P.M.	16 55.3	100 24.6	73	...	....	....	Surface haul quite good.
4705	" 28	8 00 A.M.	15 5.3	99 19	72	35.3	2031	very lt. gy. yl. glob. Oz., some Diat. & very many Rad.	Tow at 300 fathoms and to surface, excellent haul; are in the western edge of the Humboldt current. Brought up very little in the trawl.
4706	" 28	8 00 P.M.	14 18.7	98 45.8	72	...	....	....	Very fair surface haul.
4707	" 29	8 00 A.M.	12 33.2	97 42	72	35.3	2120	dk. choc. br. Oz., very many glob. & Rad. & Coscinod.	Tow at 300 fathoms, excellent haul.
4708	" 29	8 00 P.M.	11 40	96 55	72	...	....	....	Very good surface haul.
4709	" 30	8 00 A.M.	10 15.2	95 40.8	72	35.3	2035	lt. gy. glob. Oz., very many Rad. & Diat.	Fair haul towing at 300 fathoms. Trawl tripped, but good trawl haul in bag. Earbones, sharks' teeth, and Manganese nodules.
4710	" 30	8 00 P.M.	9 30.5	95 8.3	74	...	....	....	Surface haul. Salpa soup.
4711	" 31	8 00 A.M.	7 47.5	94 5.5	75	35.3	2240	lt. gy. glob. Oz., with many Rad. & Diat. all dead.	Tow at 300 fathoms, very good haul. Ring trawl sent to tow at bottom. Brought up large load of Manganese nodules and a few sharks' teeth and earbones.
4712	" 31	8 00 P.M.	7 5	93 35.5	74	...	....	....	Fair surface haul.
4713	1905 Jan. 1	8 00 A.M.	5 35.3	92 21.6	73	35.3	2191	lt. br. glob. Oz. at top. of cylind., lt. gy. glob. below, few glob. at top, many Rad., few Diatoms.	Serial temperatures. Tow at 300 fathoms, good haul.

RECORD OF DREDGING, TRAWLING, AND PELAGIC STATIONS. — *Continued.*

Serial Number.	Date.	Time.	Position.		Temperatures.		Depth in Fathoms.	Character of Bottom.	Remarks.
			Latitude South.	Longitude West.	Surface.	Bottom.			
	1905.	h. m.	° ′	° ′	°	°			
4714	Jan. 1	8 00 P.M.	4 19	91 28.5	75	. . .	. . . .	. . . .	Surface haul, fair catch.
4715	" 2	8 00 A.M.	2 40.4	90 19.3	75	failed to register	1743	lt. gy. glob. Oz., many Diat. and many Rad.	Serial temperatures, at base of rim of rise of the Galapagos. Splendid haul at 300 fathoms.
4716	" 2	8 00 A.M.	2 18.5	90 2.6	75	. . .	. . . .	. . . .	Trawl, fair haul. Surface haul excellent, about 55 miles from Hood Island, Galapagos. Anchored Wreck Bay, Chatham Island, Galapagos, January 3, at 11 A.M.
4519*–4526*, 4717–4739 Galapagos to Manga Reva.									
4519*	Jan. 10	7 00 P.M.	1 31	91 4	76	35.5	1385	hard.	40 miles from abeam P. O. Bay, Charles Island, Galapagos.
4520*	" 11	12 06 A.M.	1 46.8	91 36	74	35.5	1815	gy. glob. Oz., very many Rad. & Diat.	About 75 miles from last station, on course to Manga Reva.

4521*	“ 11	8 00 A.M.	2 14.3	92 29.9	75	failed to trip	1871	glob. Oz. as at St. 4520.*	About 143 miles from Charles Island.
4522*	“ 11	4 00 P.M.	2 42.4	93 30	77	35.4	1924	lt. gy. glob. Oz., gt. many Rad. and Diatoms.	Pump filter collected on this line at 8 A.M. daily.
4523*	“ 12	8 00 A.M.	3 34	95 35.4	77	35.3	2031	wh. glob. Oz., very many Rad. & Diat.	
4717	“ 13	8 00 A.M.	5 10	98 56	75	35.2	2153	red br. glob. Oz., glob. much brok. up, many Diat. & many Rad. filled with blk. min. part.	Tow at 300 fathoms, very fine haul. Trawl excellent catch. Serial temperatures.
4718	“ 13	8 00 P.M.	5 32.4	99 32.2	76	...	....	....	Excellent surface haul.
4719	“ 14	8 00 A.M.	6 29.8	101 16.8	75	Th. failed to reg.	2285	Red clay, cup cut Mang. nod., no glob. or Rad.	Excellent haul 300 fms. to surface; did not dare to trawl, mang. nodules.
4720	“ 14	7 30 P.M.	7 13.3	102 31.5	76	...	....	....	Surface haul, Salpa soup.
4721	“ 15	8 00 A.M.	8 7.5	104 10.5	75	failed to reg.	2084	lt. br. glob. Oz., Sponge spic., many Diat., few Rad.	Tow 300 fms. and up to surface; excellent trawl haul; temp. serial. Huge Psychropotes 55 cm. long.
4722	“ 16	8 00 A.M.	9 31	106 30.5	75	35.1	1923	rky.	Good haul 300 fms. to surface.
4723	“ 16	7 30 P.M.	10 14.3	107 45.5	76	...	....	....	Fair surface haul.
4724	“ 17	8 00 A.M.	11 13.4	109 39	79	35.1	1841	hrd., col. cup empty.	Tow at 300 fms. to surface; rather poor, serial temp., trawl came up empty.
4725	“ 17	7 30 P.M.	11 38.3	110 5	77	...	....	....	Poor surface haul.

* Hydrographic Stations.

RECORD OF DREDGING, TRAWLING, AND PELAGIC STATIONS. — *Continued.*

Serial Number.	Date.	Time.	Position.		Temperatures.		Depth in Fathoms.	Character of Bottom.	Remarks.
			Latitude South.	Longitude West.	Surface.	Bottom.			
	1905	h. m.	° ′	° ′	°	°			
4726	Jan. 18	8 00 A.M.	12 30.1	111 42.2	78	35.1	1700	choc. br. M. full of glob., aren. For. Sponge spic., few Diat. Coscin., few Rad.	About half way to Manga Reva from the Galapagos. *Garrett Ridge;* trawl came up empty.
4727	" 18	7 30 P.M.	13 03	112 44.9	77	. . .	. . . .	. . . .	Fair surface haul.
4728	" 19	8 00 A.M.	13 47.5	114 21.6	77	35.8	1055	glob. S. pkd. hrd. in mudbag. Few Diat. & Rad.	Tow at 300 fms. to surface, trawl empty, mudbag full of glob. sand, temp. serial, *Garrett Ridge.*
4729	" 19	7 30 P.M.	14 15	115 13	78	. . .	. . . .	. . . .	Rather poor surface haul.
4730	" 20	8 00 A.M.	15 7	117 1.2	79	35	1912	clasper did not close.	Tow at 300 fms. to surface, fair haul, dropped back to general level of oceanic plateau ("Albatross").
4731	" 20	7 30 P.M.	15 47.2	118 22.5	79.5	. . .	. . . .	. . . .	Very poor surface haul.
4732	" 21	8 00 A.M.	16 32.5	119 59	79	34.8	2012	lt. gy. glob. Oz., sharks' teeth, and carbones, mang. nod., very few Diat. & Rad., Sponge spic.	Serial temperatures, tow at 300 fms. to surface, very poor; little in trawl.

4733	" 21	7 30 P.M.	16 57.4	120 48	80	...	....	....	Fair surface haul.
4734	" 22	8 00 A.M.	17 36	122 35.6	81	34.9	2019	nothing in cup	Tow at 300 and up to surface, very poor haul.
4735	" 22	7 30 P.M.	18 16	123 34.4	81	...	....	....	Surface haul very poor.
4736	" 23	8 00 A.M.	19 0.4	125 5.4	81	34.8	2289	dk. br. choc. M. full of glob., very few Rad., in trawl sharks' teeth, ear-bones, pumice & Mang. slabs.	Tow at 300 and up to surface, very poor. Trawl frame badly twisted, net torn. Mudbag full of brown sticky mud.
4737	" 24	8 00 A.M.	19 57.5	127 20.3	81.5	34.8	2060	very little in clasper, dk. br. choc. M. full of glob.	Tow at 300 and up to surface, very poor haul. Towed Petersen closing net from 550 to 400, fathoms, nothing in net.
4738	" 24	7 30 P.M.	20 26.5	128 30.2	81	...	....	....	Very poor surface haul.
4524*	" 25	8 00 A.M.	21 3	130 10.3	80	34.5	2197	dk. br. choc. M. glob., Mang. nod.	Too rough to work.
4525*	" 25	7 00 P.M.	21 36.1	131 35.3	80	34.8	2123	stky. red clay with glob., no Diat., very few Rad., fine min. part.	
4739	" 26	8 00 A.M.	22 11.1	133 21	79	34.9	2042	dk. gy. glob. Oz., no Diat., very few Rad. in mudbag, obsidian like frag.; large & sml. Mang. nod.	Tow at 300 very poor haul, trawl tripped. Bag empty. Little in mudbag. Serial temp.

*Hydrographic Stations.

RECORD OF DREDGING, TRAWLING, AND PELAGIC STATIONS. — *Continued.*

Serial Number.	Date.	Time.	Position.		Temperatures.		Depth in Fathoms.	Character of Bottom.	Remarks.
			Latitude South.	Longitude West.	Surface.	Bottom.			
	1905.	h. m.	° ′	° ′	°	°			
Off East Face of Manga Reva.									
4526*	Jan. 27	6 45 A.M.	11 m. N. E. off Mt. Duff		78	34.6	2070	lt. br. glob. Oz.	Very steep off the group. No plateau here.
4527*–4530* Taken on Leaving Manga Reva.									
4527*	Feb. 5		Reef flat about ¼ m. from the ship		77	53.5	225	coralline & wh. S.	Off Tekava.
4528*	" 5		Reef flat about ¼ m. from the ship		78	50.4	245	coralline S., brk. Sh. Pteropods, Nullip.	Off East Point of barrier reef.
4529*	" 5		Reef flat less than ¼ m. from ship		77	51.5	241	hard.	Off Vaitekeue.
4530*	" 5		About 3½ m. N. E. from last station		77.5	35.0	1394	coral S. & coralline.	

4531*–4547*, 4740–4743 Manga Reva to Acapulco.

4531*	Feb. 6	8 00 A.M.	21 4.5	133 1.2	79	35.0	2225	rd. clay M., many min. part., very few glob., no Rad. or Diatoms.	Very little in the tubes.
4532*	" 7	8 00 A.M.	18 29.4	130 50.8	81	34.5	2319	dk. br. choc. M., few lrg. glob., Sponge spic., Mang. nod.	
4533*	" 8	8 00 A.M.	16 20.3	128 46	82	34.5	2194	same bot. as Stn. 4532*	Very little in claspers.
4534*	" 9	8 00 A.M.	13 51	126 53.5	82	34.6	2185	dk. gy. glob. Oz., lrg. glob., many blk. Mang. part. few crystals. Aren. Foram, Sponge spic., very few Rad.	Quantities in tow-nets begin to increase.
4535*	" 10	8 00 A.M.	11 20	125 1.3	80	34.5	2215	lt. gy. glob. Oz., very few blk. min. part, quite a no. of Rad., some Diat. & Coscinod. Euodia.	
4740	" 11	8 00 A.M.	9 2.1	123 20.1	81	34.2	2422	dk. gy. glob. Oz., lrg. glob., very few blk. min. part., very many dead Rad. belonging to the surface colonial types, lrge. no. of Diat. 10° from equator.	Excellent trawl haul, carbones, Manganese nodules. Superb sharks' teeth, very fair tow at 300 fathoms and up.

* Hydrographic Stations.

RECORD OF DREDGING, TRAWLING, AND PELAGIC STATIONS. — *Continued.*

Serial Number.	Date.	Time.	Position.		Temperatures.		Depth in Fathoms.	Character of Bottom.	Remarks.
			Latitude South.	Longitude West.	Surface.	Bottom.			
	1905.	h. m.	°	° ′	°	°			
4741	Feb. 11	7 30 P.M.	8 29.7	122 56	80	. . .	. . . .	. . . .	Very fair surface haul; fine stuff in net very thick; haul resembles those of the northern part of Eastern lines.
4536*	" 12	8 00 A.M.	7 10.3	122 13.2	80	34.3	2380	nothing in tubes prob. looser glob. Oz. than yesterday.	
4537*	" 13	8 00 A.M.	4 50.5	120 45.7	79	34.3	2350	very lt. gy. fne. glob. Oz., few blk. min. part., gd. no. of Rad., some Diatoms, Coscinod.	
4538*	" 14	8 00 A.M.	2 14	118 55.1	79	34.3	2291	very fine lt. gy. glob., very many Rad. & Diatoms, Cosc. Euodia; few min. part.	
4742	" 15	8 00 A.M.	*North.* 0 3.4	117 15.8	77	34.3	2320	very lt. fine gy. glob. Oz., very few. blk. min. part., much silicious débris; great many Rad. & Diat. Cosc. Euodia, Synedra; short silic. needles, some Silico-flagellates.	Tow at 300, very good haul. Trawl; superb haul: Rhizocrinus stems, viviparous Benthodytes. Strange egg cluster. Squid?

4743	" 15	7 30 P.M.	0 21.3	117 2.6	78	...	....	....	Excellent surface haul.
4539*	" 16	8 00 A.M.	1 35	116 38	78.5	34.4	2189	tubes came up clean probably still less stky. glob. Oz., all washed out.	Physalia sailed by.
4540*	" 17	8 00 A.M.	3 25.6	115 5.4	79	34.4	2200	dk. gy. glob. Oz., lrg. glob., many blk. Mang. part., many Rad. & Diatoms, few Cosc., Sponge spic.	Large Velella sailed by; from surface net: Appendiculariae, Pteropods, Copepods, Coscinodiscus, Euodia, Synedra, Acantharian Radiolaria, Pyrocystis Ceratium Planktoniella; approaching westerly warm current.
4541*	" 18	8 00 A.M.	4 55	112 27	80	34.4	2174	dk. gy. glob. Oz., lrg. glob., Rad. filled with blk. mud.	Diatoms have disappeared; are in warm western tropical current.
4542*	" 19	8 00 A.M.	7 8.7	110 45.3	80	34.5	2225	no sample in tubes.	
4543*	" 20	8 00 A.M.	8 52.2	108 54	79.5	34.7	2058	rd. cly. dk. choc. br. stky. M., few glob., many sm. blk. Mang. part., few Rad., Sponge spic., transp. min. cryst. mass of yel. floc. mat.	

* Hydrographic Stations.

RECORD OF DREDGING, TRAWLING, AND PELAGIC STATIONS. — *Continued.*

Serial Number.	Date.	Time.	Position.		Temperatures.		Depth in Fathoms.	Character of Bottom.	Remarks.
			Latitude North.	Longitude West.	Surface.	Bottom.			
	1905.	h. m.	° ′	° ′	°	°			
4544*	Feb. 21	8 00 A.M.	10 38	106 47.6	80	34.4	1955	stky. dk. choc. br. M., many blk. Mang. part.	
4545*	" 22	8 00 A.M.	12 42.5	104 45	79	34.9	1753	stky. dk. choc. br. M., blk. part. of Mang.	
4546*	" 23	8 00 A.M.	14 50	101 31	81	35.2	2050	stky. dk. choc. br. M., many blk. part. of Mang.	
4547*	" 24	4 00 A.M.	16 20.2	99 58.4	83	35.2	2474	shot brought back.	About 29 miles south of Acapulco Light; western extension of deep hole east of Acapulco. Last sounding.

* Hydrographic Stations.

NOTE. — Owing to an error in the records of the "Albatross," the hydrographic numbers 4504* to 4547* are incorrect; they should be Nos. 4805* to 4847*. As a mass of pelagic material was labelled to correspond to these stations as originally recorded, it was found impossible to change the record, and to prevent confusion we can only call attention to the discrepancy.

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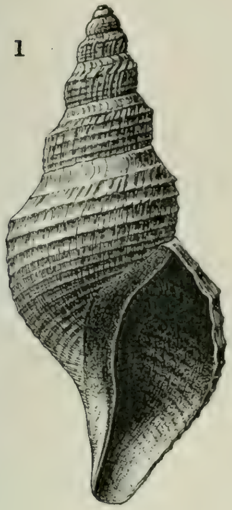
PLATE 1.

FIG. 1. *Pleurotomella (Phymorhynchus) castanea* Dall; alt. 53 mm.; p. 284.
FIG. 2. *Cancellaria (Merica) io* Dall; alt. 43 mm.; p. 295.
FIG. 3. *Pleurotomella (Phymorphynchus?) clarinda* Dall; alt. 39.0 mm.; p. 285.
FIG. 4. *Cancellaria (Merica) corbicula* Dall; alt. 21.5 mm.; p. 294.
FIG. 5. *Borsonia (Borsonella) agassizii* Dall; alt. 23.0 mm.; p. 275.
FIG. 6. *Pleurotomella (Gymnobela) agonia* Dall; alt. 25 mm.; p. 278.
FIG. 7. *Gemmula benthima* Dall; alt. 28.0 mm.; p. 267.
FIG. 8. *Cancellaria (Merica) centrota* Dall; alt. 35 mm.; p. 295.
FIG. 9. *Glyphostoma immaculata* Dall; alt. 10.4 mm.; p. 289.

The drawings for this plate were made by the late Dr. J. C. McConnell.

1



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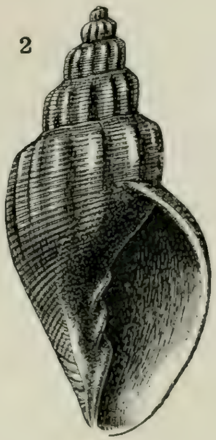

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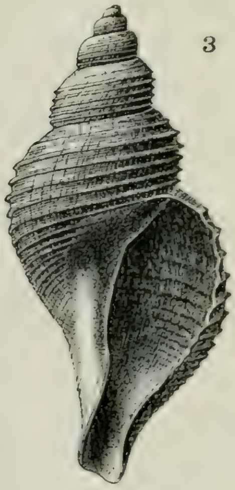

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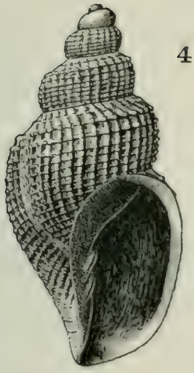

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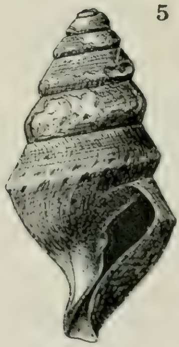

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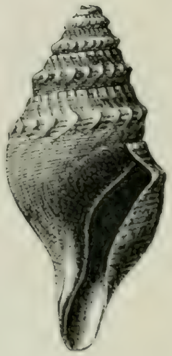

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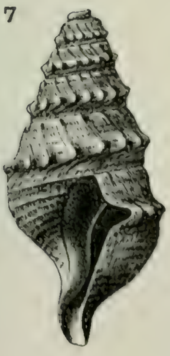

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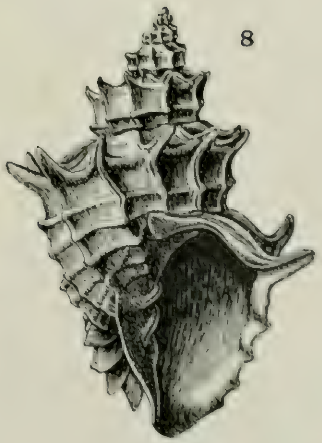

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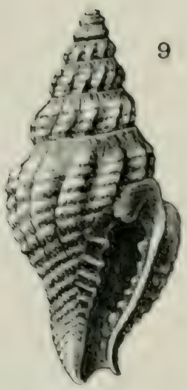
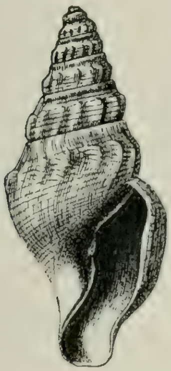


PLATE 2.

FIG. 1. *Leucosyrinx erosina* Dall; alt. 28.0 mm.; p. 269.
FIG. 2. *Daphnella* (*Eubela*) *imparella* Dall; alt. 12.7 mm.; p. 291.
FIG. 3. *Pleurotomella* (*Gymnobela*) *xylona* Dall; alt. 27 mm.; p. 280.
FIG. 4. *Gaza rathbuni* Dall, basal view; diam. 45 mm.; p. 347. See also plate **3**, figure 6.
FIG. 5. *Steiraxis aulaca* Dall; alt. 60 mm.; p. 273.
FIG. 6. *Truncaria brunneocincta* Dall; alt. 31.5 mm.; p. 304.
FIG. 7. *Tractolira sparta* Dall; alt. 60 mm.; p. 299.

The drawings for this plate were made by the late Dr. J. C. McConnell.



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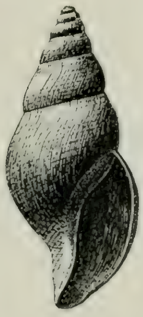

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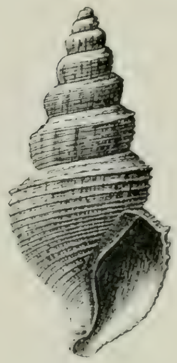

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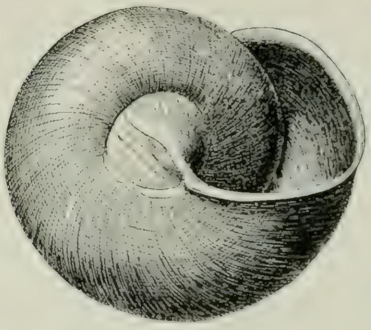

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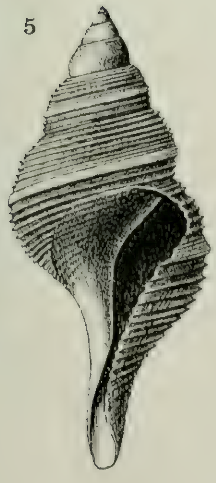

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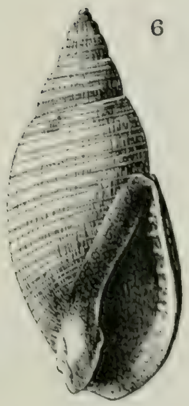

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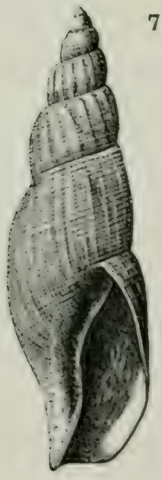

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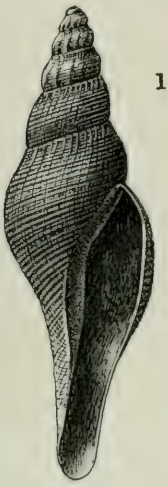
PLATE 3.

Fig. 1. *Daphnella* (*Surculina*) *blanda* Dall; alt. 26.5 mm.; p. 291.
Fig. 2. *Solariella ceratophora* Dall; alt. 28 mm.; p. 350.
Fig. 3. *Fusinus* (*Exilia?*) *rufocaudatus* Dall; alt. 30 mm.; p. 302.
Fig. 4. *Choristes carpenteri* Dall; alt. 21 mm.; p. 328.
Fig. 5. *Solariella nuda* Dall, basal view; diam. 19 mm.; p. 349.
Fig. 6. *Gaza rathbuni* Dall, profile; alt. 30 mm. See also plate **2**, figure 4; p. 347.
Fig. 7. *Solariella nuda* Dall, profile; alt. 15 mm.; p. 349.

The drawings for this plate were made by the late Dr. J. C. McConnell.



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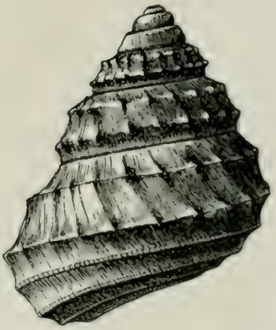

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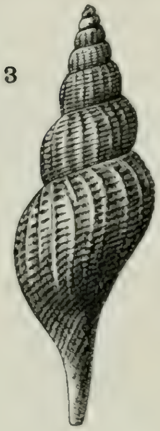

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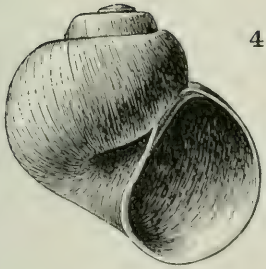

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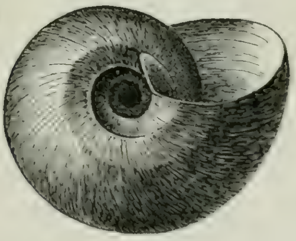

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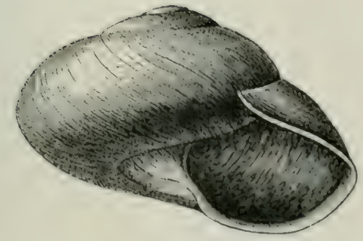

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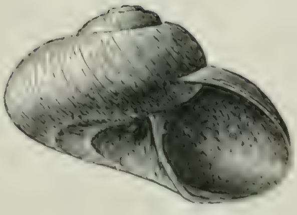

PLATE 4.

Fig. 1. *Alectrion (Hima) miser* Dall; alt. 20.0 mm.; p. 307.
Fig. 2. *Solariella galapagana* Dall; alt. 17.0 mm.; p. 350.
Fig. 3. *Pleurotomella (Gymnobela) isogonia* Dall; alt. 12.5 mm.; p. 279.
Fig. 4. *Cancellaria (Admete ?) californica* Dall, adolescent specimen; alt. 9. mm.; p. 296.
Fig. 5. *Puncturella (Cranopsis) expansa* Dall, profile; alt. 10 mm.; p. 353.
Fig. 6. *Mangilia enora* Dall, alt. 9.5 mm.; p. 286.
Fig. 7. *Oöccrys (Benthodolium) pacifica* Dall, with operculum; alt. 30 mm.; p. 323.
Fig. 8. *Dentalium agassizii* Pilsbry and Sharp; lon. 65 mm.; p. 358.
Fig. 9. *Oöcorys rotunda* Dall, immature; alt. 45 mm.; p. 322.
Fig. 10. *Puncturella (Cranopsis) expansa* Dall, from below; width 26 mm.; p. 353.
Fig. 11. The same from above; length, 32 mm.

The drawings for this plate were made by the late Dr. J. C. McConnell.

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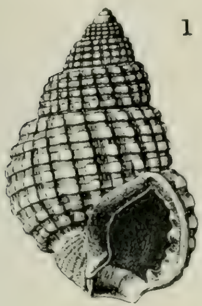

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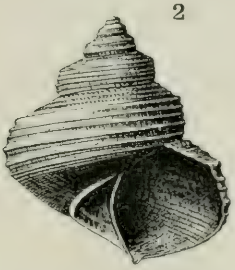

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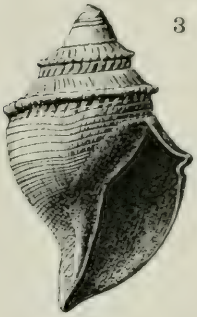

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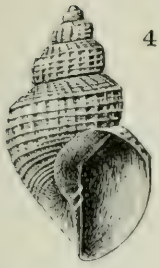

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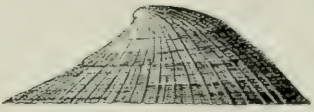

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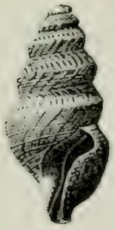

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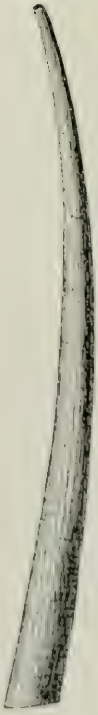

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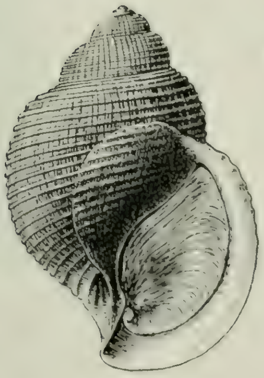

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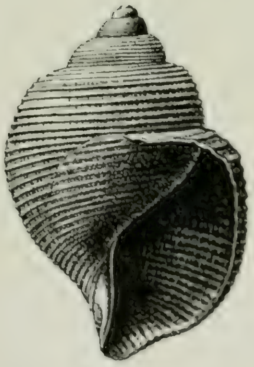

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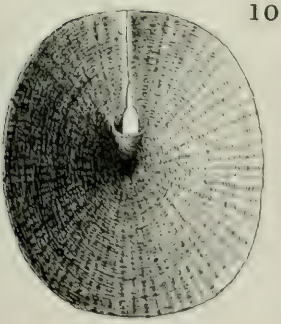

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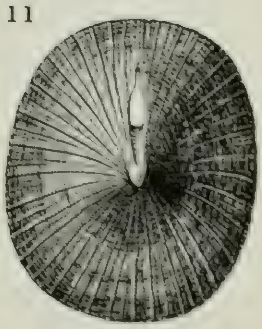
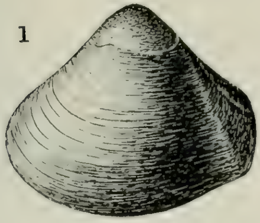


PLATE 5.

FIG. 1. *Poromya (Dermatomya) equatorialis* Dall, side view; lon. 6.5 mm.; p. 429.
FIG. 2. The same, left valve from above, showing the projecting lateral tooth.
FIG. 3. *Cadulus striatus* Dall; lon. 24.8 mm.; p. 360.
FIG. 4. *Myonera garretti* Dall, profile; lon. 13.5 mm.; p. 434.
FIG. 5. *Yoldia (Katadesmia) vincula* Dall; lon. 14 mm.; p. 379.
FIG. 6. *Solenosteira elegans* Dall; alt. 38 mm.; p. 300.
FIG. 7. *Acteon (Microglyphis) mazatlanicus* Dall; alt. 5.5 mm.; p. 237.
FIG. 8. *Adelomelon benthalis* Dall (the entire surface is slightly eroded); alt. 125 mm.; p. 298.
FIG. 9. *Leptothyra panamensis* Dall; alt. 9.5 mm.; p. 342.
FIG. 10. *Terebra (Strioterebrum) panamensis* Dall; alt. 22.0 mm.; p. 250.
FIG. 11. *Solariella equatorialis* Dall; alt. 21 mm.; p. 351.

The drawings for this plate are by the late Dr. J. C. McConnell.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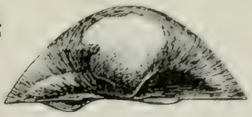
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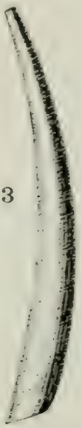
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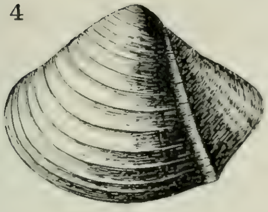
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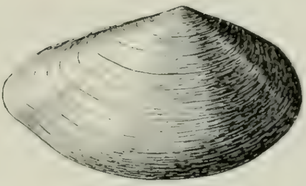
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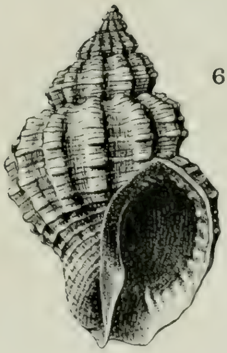
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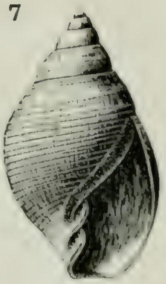
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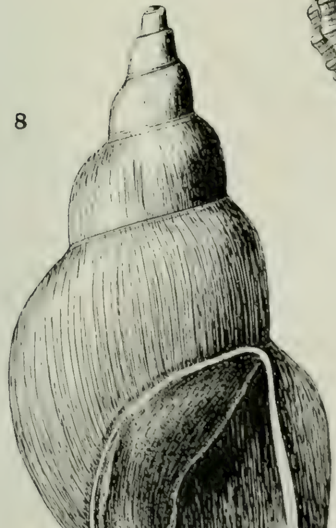
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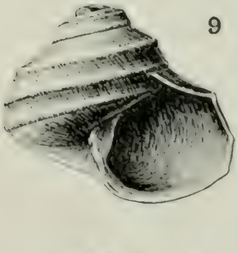
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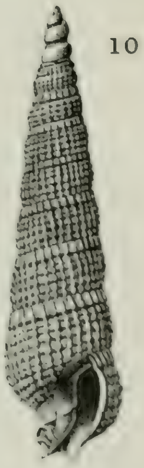
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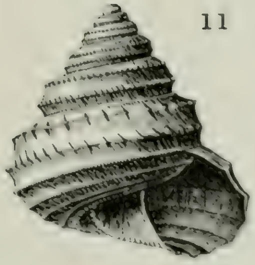
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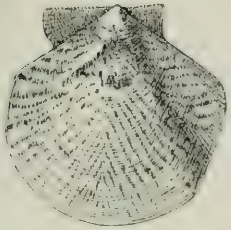
PLATE 6.

FIG. 1. *Pecten* (*Pseudamusium*) *cocosensis* Dall, left valve ; alt. 8.7 mm. ; p. 405.
FIG. 2. *Cardita* (*Glans*) *sulcosa* Dall, right valve ; lon. 8.5 mm. ; p. 412.
FIG. 3. *Pecten* (*Pseudamusium*) *cocosensis* Dall, right valve ; alt. 8.7 mm. ; p. 405.
FIG. 4. *Leda* (*Jupiteria*) *agapea* Dall, dorsal view ; lon. 21.0 mm. ; p. 373.
FIG. 5. The same in profile.
FIG. 6. *Leda cordyla* Dall, dorsal view ; lon. 8.5 mm. ; p. 375.
FIG. 7. The same in profile.
FIG. 8. *Pecten* (*Pseudamusium*) *panamensis* Dall, exterior of left valve ; lat. 18.0 mm. ; p. 404.
FIG. 9. *Pecten* (*Propeamusium*) *malpelonium* Dall, exterior of left valve ; alt. 18.2 mm. ; p. 405.
FIG. 10. *Pecten* (*Pseudamusium*) *panamensis* Dall, exterior of right valve ; lat. 16.0 mm. ; p. 404.
FIG. 11. *Nucula panamina* Dall ; lon. 22.0 mm. ; p. 368.
FIG. 12. *Vesicomya* (*Callogonia*) *angulata* Dall, interior of right valve ; lon. 58 mm. ; p. 419.

The drawings for this plate are by the late Dr. J. C. McConnell.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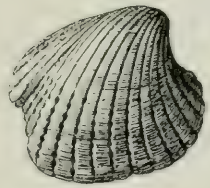
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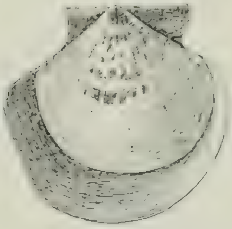
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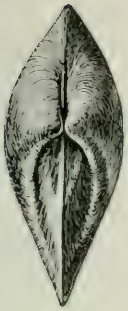
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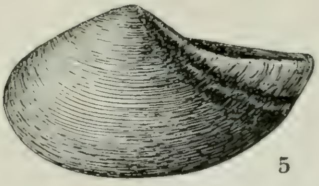
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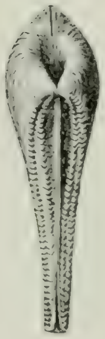
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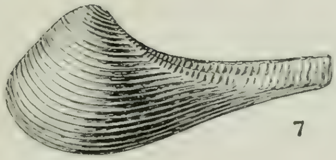
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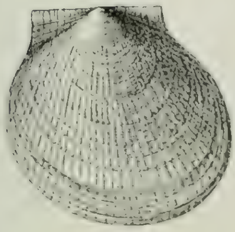

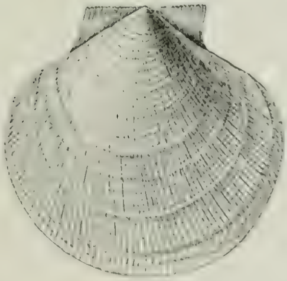
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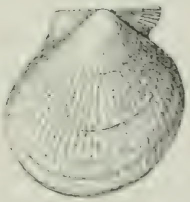

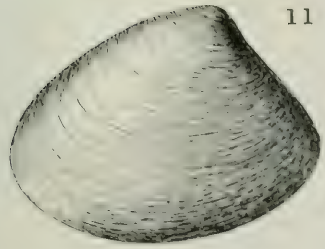
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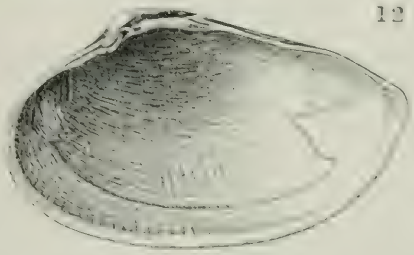
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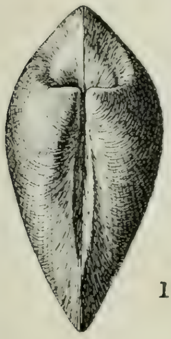
PLATE 7.

Fig. 1. *Nucula iphigenia* Dall, dorsal view; lon. 35.0 mm.; p. 369.
Fig. 2. *Lima (Acesta) diomedae* Dall; alt. 35.0 mm.; p. 407.
Fig. 3. *Nucula taeniolata* Dall, dorsal view; lon. of shell, 17.0 mm.; p. 368.
Fig. 4. *Nucula iphigenia* Dall, profile of right valve; lon. 35.0 mm.; p. 369.
Fig. 5. *Nucula taeniolata* Dall, profile; lon. 17.0 mm.; p. 368.
Fig. 6. *Limopsis zonalis* Dall, interior view, margins entire; lon. 27.0 mm.; p. 393.
Fig. 7. *Limopsis compressus* Dall, view of interior of left valve; lon. 45.0 mm., exclusive of the hairs; p. 394.
Fig. 8. The same, exterior of left valve; with hairy periostracum.
Fig. 9. *Limopsis zonalis* Dall, exterior; lon. 27.0 mm.; p. 393.

The drawings for this plate are by the late Dr. J. C. McConnell.



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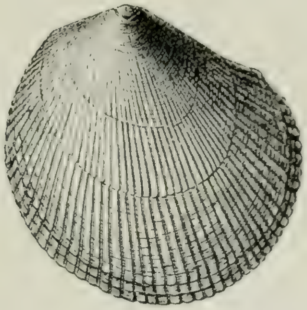

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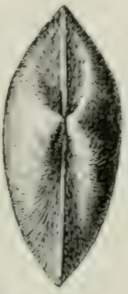

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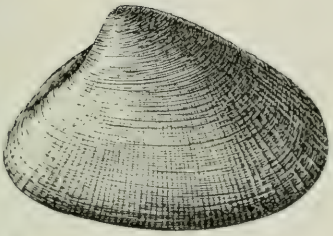

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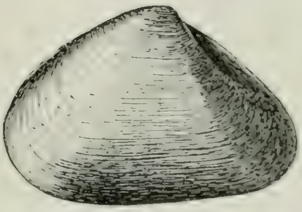

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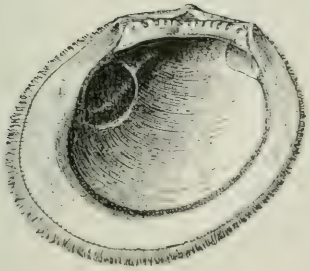

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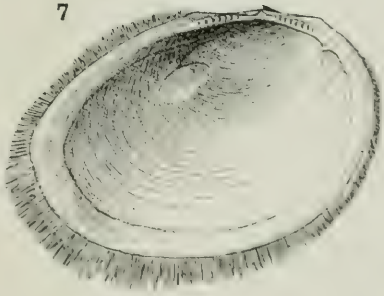

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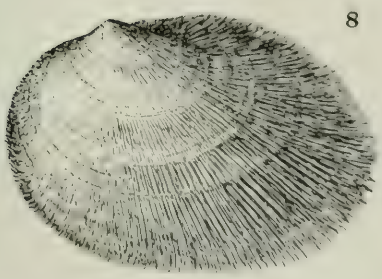

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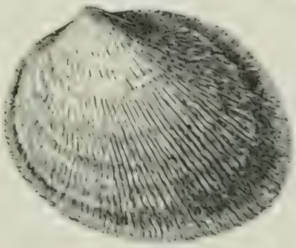

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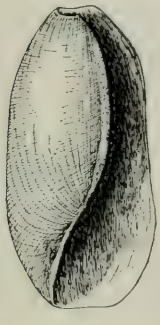
PLATE 8.

Fig. 1. *Scaphander cylindrellus* Dall; alt. 33.0 mm.; p. 239.
Fig. 2. *Polynices* (*Euspira*) *solutus* Gould; alt. 17.0 mm.; p. 335.
Fig. 3. *Clanculus* (*Panocochlea*) *rubidus* Dall, young shell, the aperture not fully formed; max. diam. 6.0 mm.; p. 346.
Fig. 4. The same, from above.
Fig. 5. *Phos cocosensis* Dall; alt. 47.0 mm.; p. 306.
Fig. 6. *Pecten* (*Pallium*) *miser* Dall; alt. 34.0 mm.; p. 401.
Fig. 7. *Tritonoharpa vexillata* Dall (the color bands of the shell are not shown); alt. 15.0 mm.; p. 320.
Fig. 8. *Epitonium* (*Ferminoscala*) *ferminianum* Dall (this specimen is not quite mature and does not show the final varix); alt. 38.0 mm.; p. 316.
Fig. 9. *Oöcorys elevata* Dall; alt. 60.0 mm.; p. 322.
Fig. 10. *Epitonium* (*Ferminoscala*) *brunneopictum* Dall; alt. 37.5 mm.; p. 316.

Figures 1, 2, 7, and 9 were drawn by Miss Evelyn Mitchell; the others by the late Dr. J. C. McConnell.



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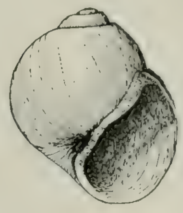

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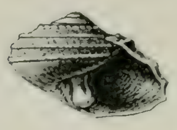

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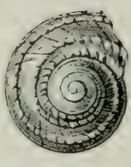

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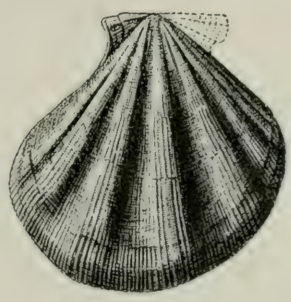

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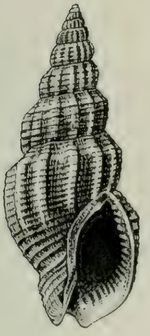

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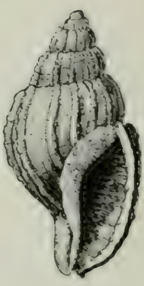

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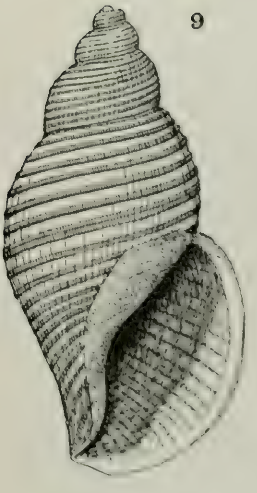

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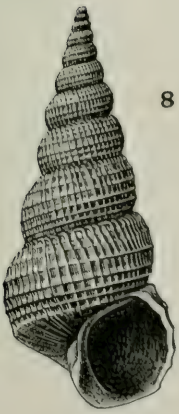

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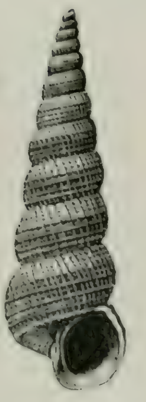

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PLATE 9.

Fig. 1. Cephalopod beak, showing excavations made by *Bathysciadium pacificum* (circular) and *Cocculina* (ovoid) $\frac{2}{1}$; p. 339.

Fig. 2. *Polynices* (*Euspira*) *agujanus* Dall; alt. 26.0 mm.; p. 334.

Fig. 3. *Bathysciadium pacificum* Dall, viewed from above; diameter of base 5.0 mm.; p. 339.

Fig. 4. *Pecten* (*Pseudamusium*) *neoceanicus* Dall; alt. 12.0 mm ; p. 402.

Fig. 5. *Epitonium* (*Sthenorhytis*) *turbinum* Dall; basal view; diameter 28.0 mm.; p. 317.

Fig. 6. The same, viewed from above, showing the decollation of the spire.

Fig. 7. *Bathysciadium pacificum* Dall, in profile, showing fringes of periostracum; p. 339.

Fig. 8. *Epitonium* (*Sthenorhytis*) *turbinum* Dall, profile of decollate specimen; diameter 28.0 mm.; p. 317.

Figure 4 was drawn by the late Dr. J. C. McConnell, the others by Miss Evelyn Mitchell.

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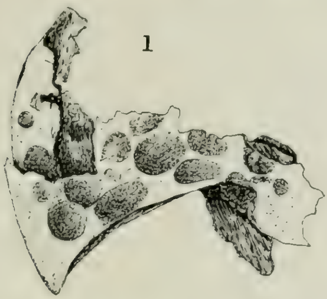

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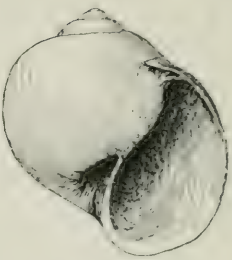

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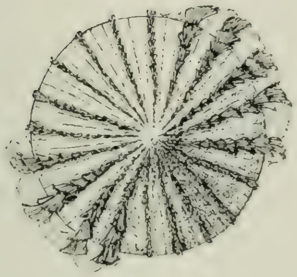

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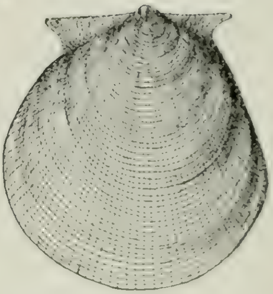

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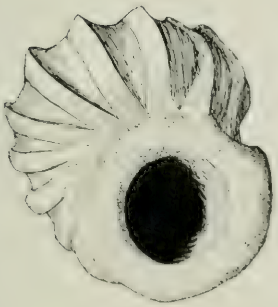

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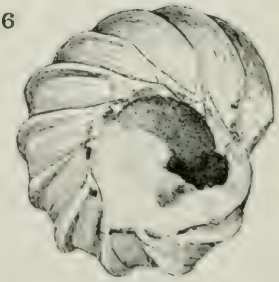

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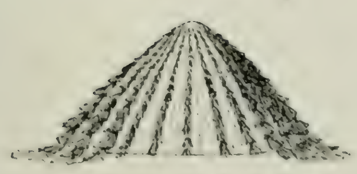

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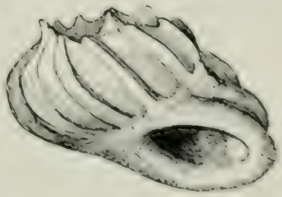
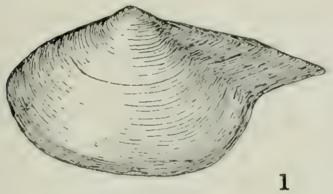


PLATE 10.

FIG. 1. *Leda (Spinula) calcar* Dall; lon. 15.2 mm.; p. 378.
FIG. 2. *Aligena borniana* Dall; lon. 14.2 mm.; p. 413.
FIG. 3. *Malletia peruviana* Dall, profile; lon. 28.0 mm.; p. 384.
FIG. 4. *Tellina (Moerella) chrysogona* Dall, profile; lon. 13.0 mm.; p. 420.
FIG. 5. *Malletia peruviana* Dall, dorsal view; lon. 28.0 mm.; p. 384.
FIG. 6. *Nucula agujana* Dall, in profile; lon. 11.0 mm.; p. 370.
FIG. 7. The same, umbonal view.
FIG. 8. *Tellina (Moerella) chrysogona* Dall, umbonal view; lon. 13.0 mm.; p. 420.
FIG. 9. *Pecten (Pseudamusium) polyleptus* Dall; alt. 9.5 mm.; p. 403.
FIG. 10. *Leda (Spinula) calcar* Dall, dorsal view, showing external ligament, lunule, and escutcheon; lon. 15.2 mm.; p. 378.

The figures for this plate were drawn by Miss Evelyn Mitchell.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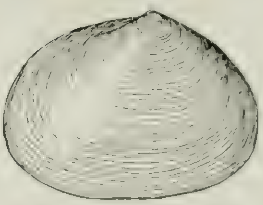
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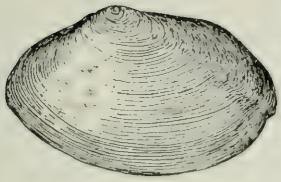
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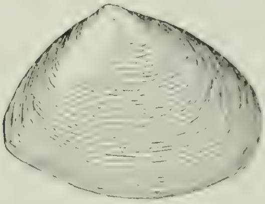
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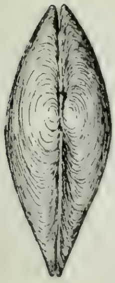
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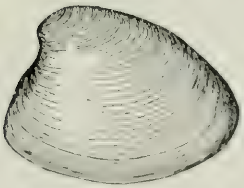
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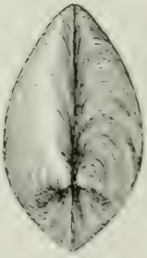
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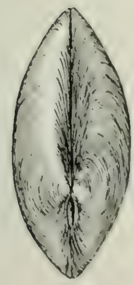
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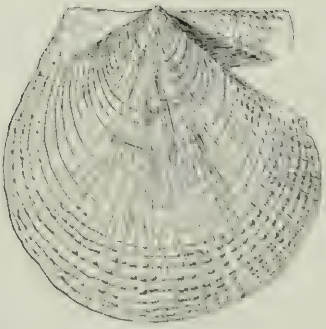
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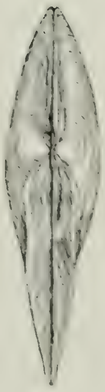
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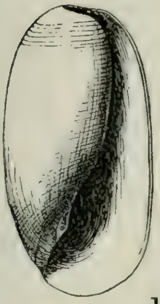
PLATE 11.

Fig. 1. *Cylichnella* (*Cylichnium*) *pizarro* Dall; alt. 9.75 mm.; p. 243.
Fig. 2. *Cylichnella* (*Cylichnium*) *atahualpa* Dall; alt. 9.0 mm.; p. 243.
Fig. 3. *Cylichnella* (*Bullinella*) *inca* Dall; alt. 6.0 mm.; p. 242.
Fig. 4. *Bullaria* (*Leucophysema*) *morgana* Dall; alt. 5.5 mm.; p. 244.
Fig. 5. *Natica* (*Cochlis*) *scethra* Dall; alt. 17.0 mm.; p. 333.
Fig. 6. *Acteon panamensis* Dall; alt. 7.0+ mm.; p. 236.
Fig. 7. *Polinices* (*Euspira*) *crawfordianus* Dall; alt. 15.0 mm.; p. 335.
Fig. 8. *Erato oligostata* Dall; alt. 3.2 mm.; p. 324.
Fig. 9. *Volutopsius? amabilis* Dall; alt. 10.5 mm.; p. 305.
Fig. 10. *Cancellaria* (*Merica?*) *microsoma* Dall; alt. 3.5 mm.; p. 296.
Fig. 11. *Alectrion* (*Hima*) *catallus* Dall; alt. 14 mm.; p. 307.
Fig. 12. *Alectrion* (*Tritia*) *exsarcus* Dall; alt. 9.0 mm.; p. 308.
Fig. 13. *Columbella* (*Anachis*) *fusidens* Dall; alt. 15.0 mm.; p. 309.
Fig. 14. *Turritella mariana* Dall; alt. 25.0 mm.; p. 327.

Figure 8 was drawn by the late Dr. J. C. McConnell, the others by Miss Evelyn Mitchell.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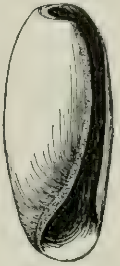
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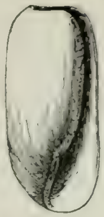
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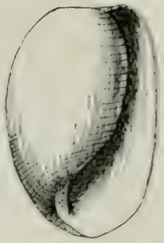
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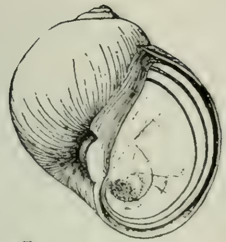
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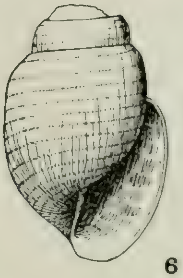
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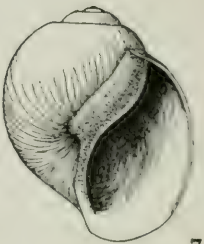
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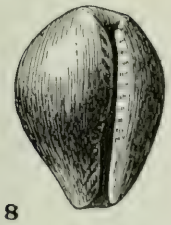
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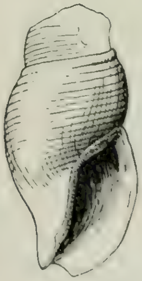
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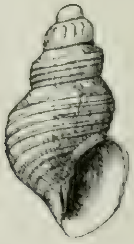
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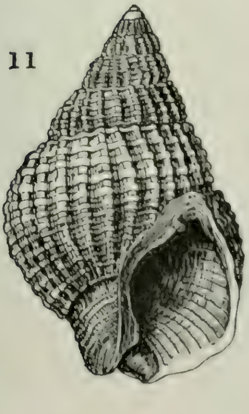

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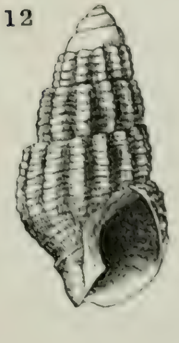

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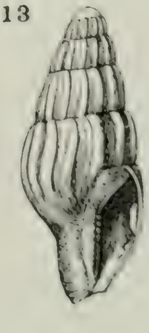

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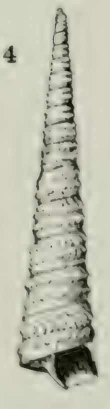

PLATE 12.

Fig. 1. *Cavolina occidentalis* Dall, with the animal fully expanded, drawn from life by W. H. Dall; max. lat. 22.0 mm.; p. 233.

Fig. 1b. The same with the pteropodia partly folded preparatory to their withdrawal into the test; width about 12 mm.

Fig. 1c. View of the "head" from above, showing the notched junction of the pteropodia and the strongly contrasted asymmetrical eye pedicels, much magnified.

Fig. 2. *Irenosyrinx persimilis* Dall; alt. 100.0 mm. ; p. 271.

Fig. 3. *Leucosyrinx? pacifica* Dall; alt. 23.0 mm.; p. 270.

Fig. 4. *Murex (Tritonalia) diomedaeus* Dall, vertical view showing varices; p. 313.

Fig. 5. The same, alt. 29.0 mm.; p. 313.

Fig. 6. *Fusinus fragilissimus* Dall, alt. 21 mm.; p. 301.

Fig. 7. *Trivia panamensis* Dall, profile view, lon. 4.2 mm.; p. 324.

Fig. 8. *Trivia atomaria* Dall, profile view, lon. 3.2 mm.; p. 323.

Fig. 9. *Trivia panamensis* Dall, basal view, p. 324.

Fig. 10. *Trivia atomaria* Dall, basal view, p. 323.

Fig. 11. The same, dorsal view.

Fig. 12. *Trivia panamensis* Dall, dorsal view, p. 324.

Figures 3 and 7–12 were drawn by the late Dr. J. C. McConnell, the others by Miss Evelyn Mitchell.

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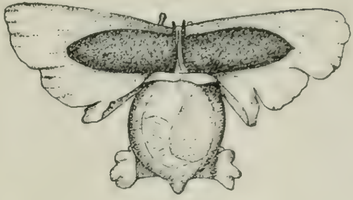

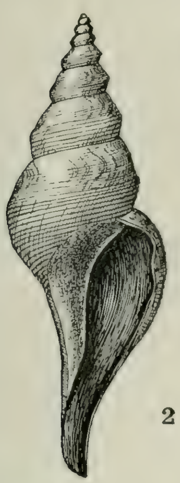

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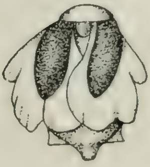

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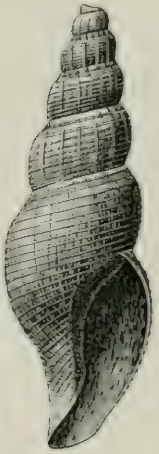

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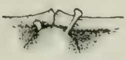

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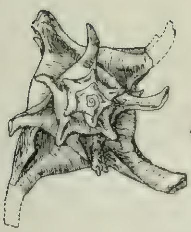

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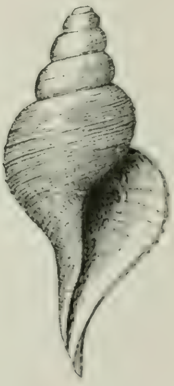

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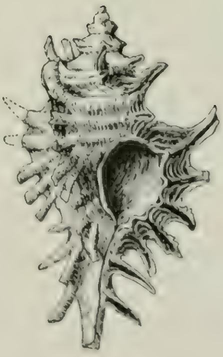

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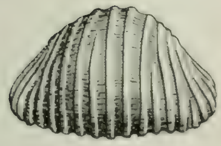

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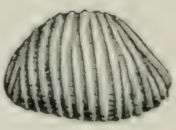

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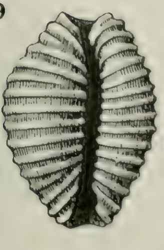

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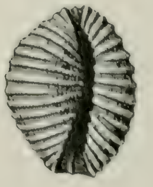

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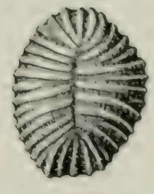

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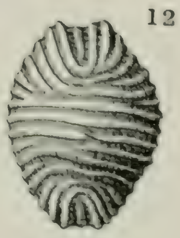
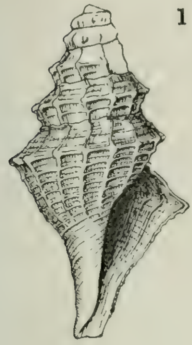


PLATE 13.

Fig. 1. *Clinura monochorda* Dall; alt. 11. 5 mm.; p. 292.
Fig. 2. *Clinura peruviana* Dall; alt. 9.0 mm.; p. 293.
Fig. 3. *Mangilia? genilda* Dall; alt. 10.5 mm.; p. 286.
Fig. 4. *Gemmula benthina* Dall; alt. 28.0 mm.; p. 267.
Fig. 5. *Gemmula exulans* Dall; alt. 17.0 mm.; p. 265.
Fig. 6. *Gemmula serilla* Dall; alt. 8.3 mm.; p. 269.
Fig. 7. *Borsonia* (*Borsonella*) *hooveri* Arnold; alt. 14.7 mm.; p. 276.
Fig. 8. *Mangilia sedillina* Dall.; alt. 8.0 mm.; p. 287.
Fig. 9. *Borsonia* (*Borsonella*) *dalli* Arnold; alt. 23.0 mm.; p. 275.
Fig. 10. *Irenosyrinx cerebristriata* Dall; alt. 48.0 mm.; p. 272.
Fig. 11. *Borsonia* (*Borsonella*) *diegensis* Dall; alt. 15.0 mm.; p. 275.

Figures 9, 10, and 11 were drawn by the late Dr. J. C. McConnell, the others by Miss Evelyn Mitchell.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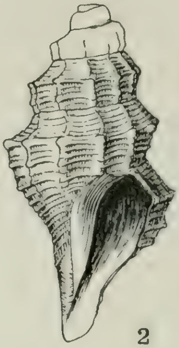
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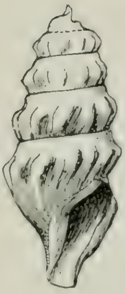
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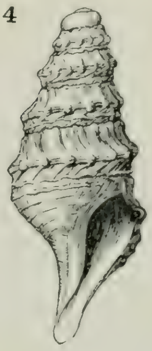
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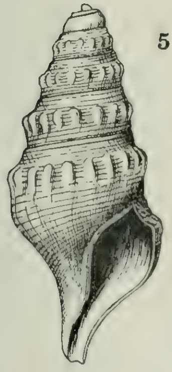
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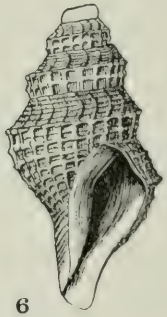
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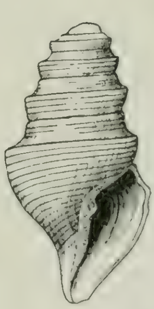
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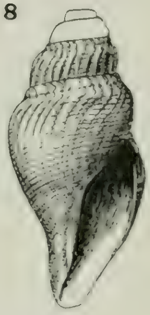
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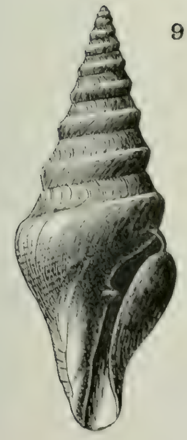
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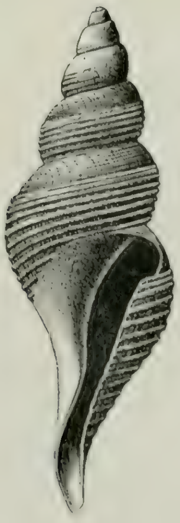
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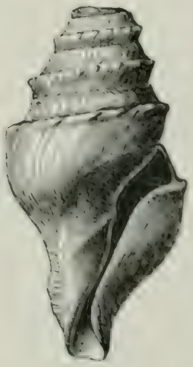
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PLATE 14.

FIG. 1. *Clathurella panamella* Dall; alt. 14.0 mm.; p. 288.
FIG. 2. *Borsonia (Borsonella) coronadoi* Dall; alt. 29.0 mm.; p. 277.
FIG. 3. *Leucosyrinx? clionella* Dall; alt. 35.0 mm.; p. 270.
FIG. 4. *Pleurotomella parella* Dall; alt. 41.0 mm.; p. 282.
FIG. 5. *Gemmula vicella* Dall; alt. 8. 5 mm.; p. 268.
FIG. 6. *Mangilia movilla* Dall; alt. 4.9 mm.; p. 285.
FIG. 7. *Surcula fusinella* Dall; alt. 17.0 mm.; p. 261.
FIG. 8. *Gemmula eldorana* Dall; alt. 8.0 mm.; p. 268.
FIG. 9. *Pleurotomella agonia* var. *altina* Dall; alt. 24.0 mm.; p. 278.
FIG. 10. *Pleurotomella suffusa* Dall; alt. 31.5 mm.; p. 282.
FIG. 11. *Mangilia encella* Dall; alt. 11.25 mm.; p. 287.
FIG. 12. *Clathurella orariana* Dall; alt. 12.0 mm.; p. 288.

The figures for this plate were drawn by Miss Evelyn Mitchell.

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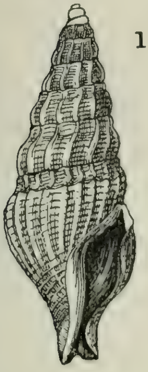

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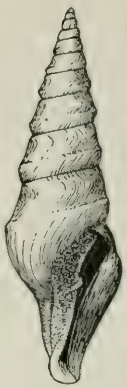

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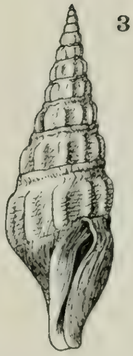

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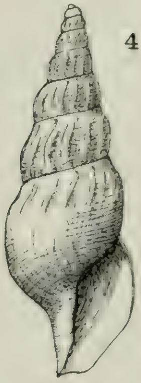

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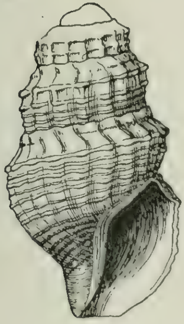

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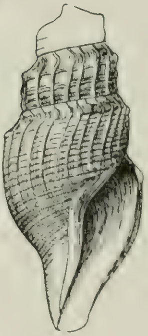

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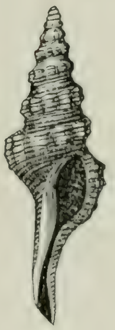

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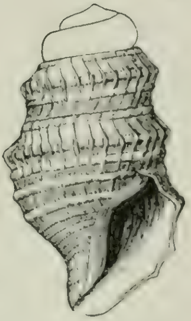

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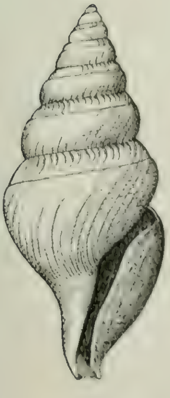

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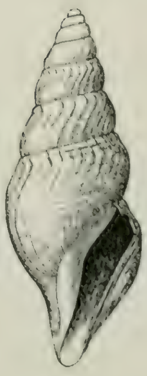

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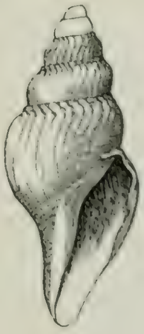

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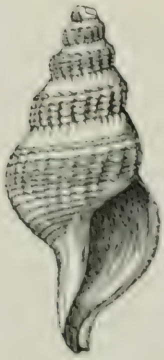
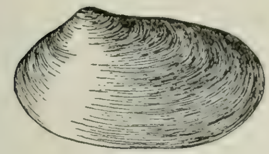


PLATE 15.

Fig. 1. *Malletia* (*Minormalletia*) *benthima* Dall, profile; lon. 9. 5 mm.; p. 386.
Fig. 2. The same, dorsal view of the same valve.
Fig. 3. *Tindaria atossa* Dall, profile; lon. 3.5 mm.; p. 388.
Fig. 4. The same, dorsal view.
Fig. 5. *Malletia* (*Minormalletia*) *arciformis* Dall, profile; lon. 10.6 mm.; p. 385.
Fig. 6. The same, dorsal view of the same valve.
Fig. 7. *Tindaria compressa* Dall, dorsal view; lon. 8.2 mm.; p. 387.
Fig. 8. The same, in profile, not quite adult.
Fig. 9. *Toledonia limnaeiformis* (Smith), in profile; alt. 3.2 mm.
Fig. 10. *Periploma* (*Halistrepta*) *sulcata* Dall; lon. 32.0 mm.; p. 427.
Fig. 11. *Typhis martyria* Dall; alt. 27.0 mm.; p. 314.
Fig. 12. *Acteon* (*Microglyphis*) *breviculus* Dall; alt. 3.6 mm.; p. 238.
Fig. 13. *Limopsis diegensis* Dall, exterior; lon. 13.0 mm.; p. 395.
Fig. 14. *Antistreptus magellanicus* Dall; alt. 4.5 mm.; p. 315.
Fig. 15. *Limopsis diegensis* Dall, interior view of the same valve; the crenulation of the margin not well shown; lon. 13 mm.; p. 395.

Figures 1 to 8 were drawn by Miss Evelyn Mitchell; the others by the late Dr. J. C. McConnell.



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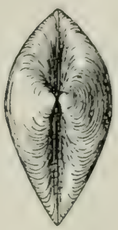

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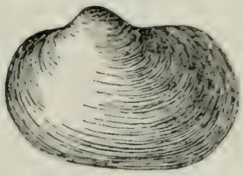

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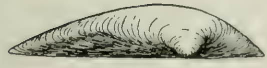

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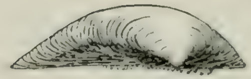

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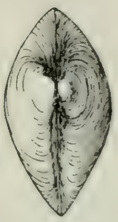

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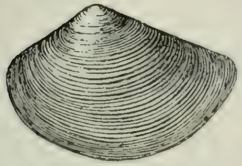

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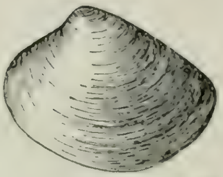

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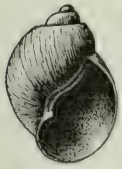

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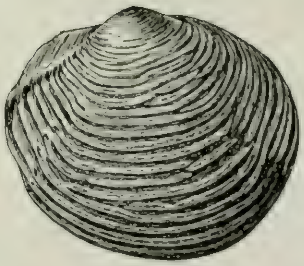

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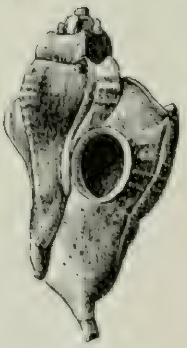

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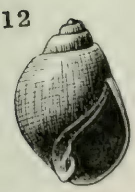

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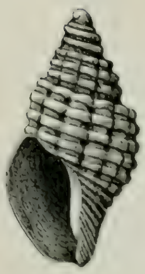

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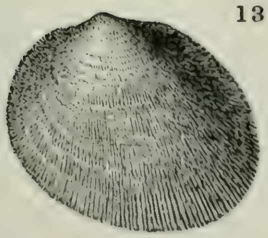

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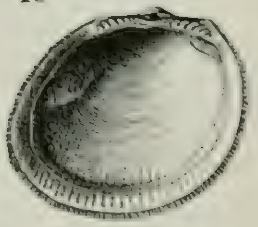

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PLATE 16.

FIG. 1. *Lima* (*Acesta*) *agassizii* Dall; alt. 98.0 mm.; p. 407.
FIG. 2. *Cuspidaria panamensis* Dall, interior of right valve; lon. 42.0 mm.; p. 432.
FIG. 3. *Cocculina nassa* Dall; lon. 8.5 mm.; p. 341.
FIG. 4. *Cocculina diomedae* Dall, profile; alt. 4.5 mm.; p. 341.
FIG. 5. *Periploma stearnsii* Dall; lon. 46.0 mm.; p. 426.
FIG. 6. *Cocculina nassa* Dall, profile view; alt. 5.0 mm.; p. 341.
FIG. 7. *Cocculina diomedae* Dall, view from above; lon. 13.0 mm.; p. 341.
FIG. 8. *Periploma carpenteri* Dall; lon. 49.0 mm.; p. 426.
FIG. 9. *Vesicomya* (*Archivesica*) *gigas* Dall; lon. 115.0 mm.; p. 418.
FIG. 10. *Solemya* (*Acharax*) *agassizii* Dall, valve stripped of the periostracum; lon. 145.0 mm.; p. 365.

The figures for this plate were drawn by Miss Evelyn Mitchell.

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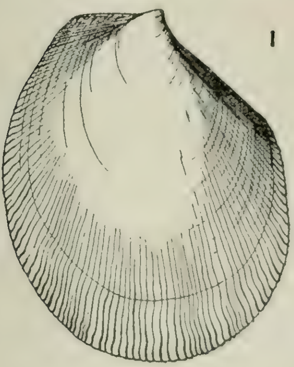

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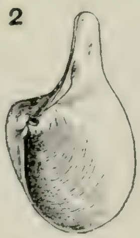

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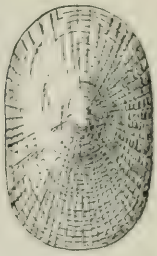

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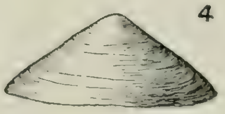

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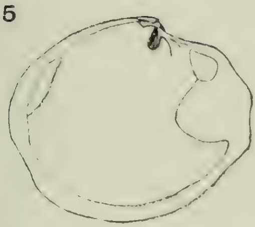

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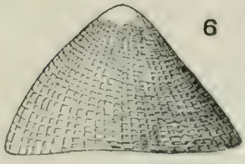

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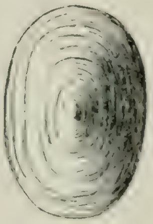

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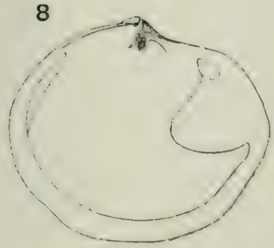

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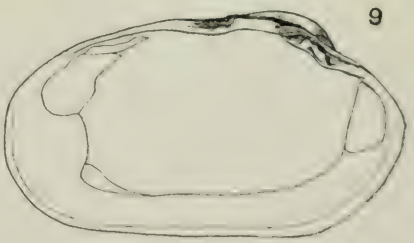

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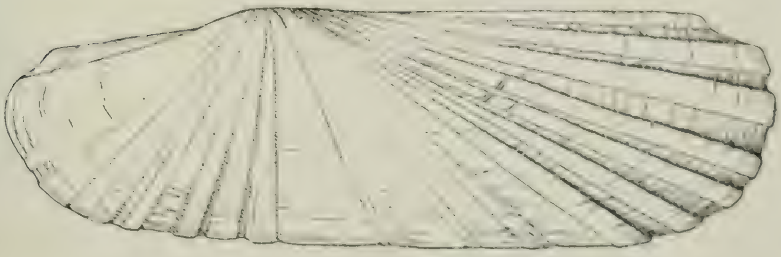
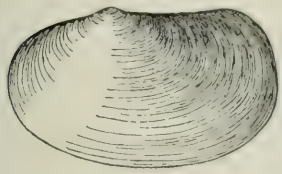


PLATE 17.

Fig. 1. *Malletia truncata* Dall, profile; lon. 22.5 mm.; p. 384.
Fig. 2. *Leda loshka* Dall; lon. 16.2 mm.; p. 376.
Fig. 3. *Leda* (*Jupiteria*) *callimene* Dall, profile; lon. 15.5 mm.; p. 372.
Fig. 4. The same, dorsal view.
Fig. 5. *Rochefortia rochebrunei* Dall; lon. 4.5 mm.; p. 414.
Fig. 6. *Tindaria smirna* Dall; lon. 5.5 mm.; p. 389.
Fig. 7. The same, dorsal view.
Fig. 8. *Arca* (*Cucullaria*) *endemica* Dall; lon. of hinge, 9.5 mm.; p. 399.
Fig. 9. *Vesicomya donacia* Dall, profile; lon. 14.5 mm.; p. 417.
Fig. 10. *Tindaria panamensis* Dall; lon. 5.5 mm.; p. 388.
Fig. 11. *Tindaria mexicana* Dall, dorsal view of valve; lon. 5.2 mm.; p. 389.
Fig. 12. *Tindaria panamensis* Dall, profile; lon. 5.5 mm.; p. 388.
Fig. 13. *Vesicomya donacia* Dall, left valve from above; lon. 14.5 mm.; p. 417.
Fig. 14. *Tindaria mexicana* Dall, profile; lon. 5.2 mm.; p. 389.
Fig. 15. *Tindaria compressa* Dall, adult, dorsal view; lon. 11.5 mm.; p. 387.
Fig. 16. The same, in profile.

The figures for this plate were drawn by Miss Evelyn Mitchell.



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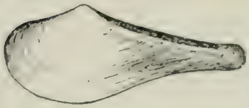

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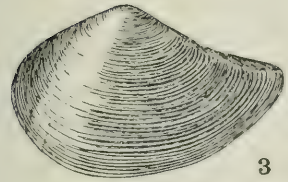

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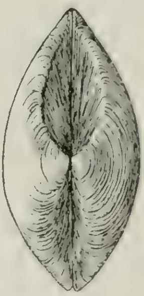

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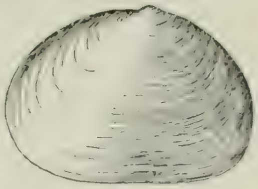

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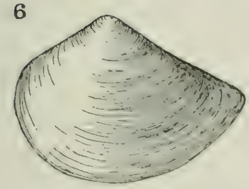

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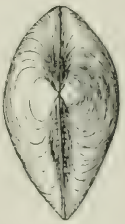

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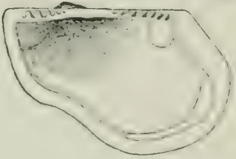

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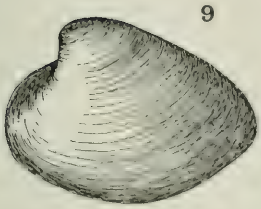

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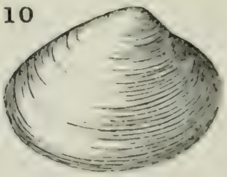

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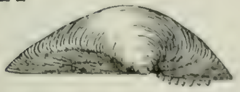

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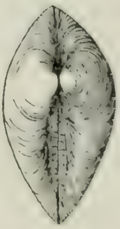

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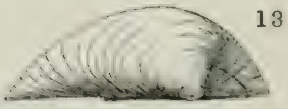

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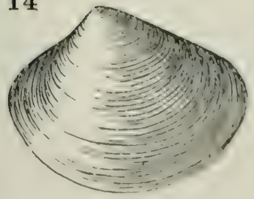

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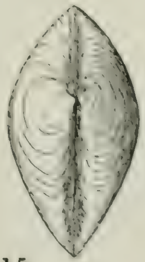

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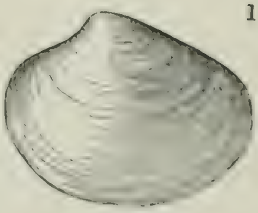


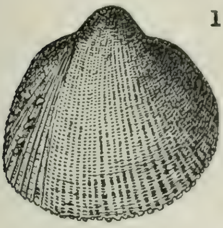
16

PLATE 18.

FIG. 1. *Protocardia panamensis* Dall; lon. 13.5 mm.; p. 415.
FIG. 2. *Poromya perla* Dall, side view; alt. 9.0 mm.; p. 428.
FIG. 3. *Nucula chrysocoma* Dall; lon. 5.0 mm.; p. 370.
FIG. 4. The same, dorsal view, showing prodissoconch.
FIG. 5. *Poromya perla* Dall, profile of left valve from in front; alt. 9.0 mm.; p. 428.
FIG. 6. *Malletia* (*Neilo*) *goniura* Dall; lon. 13.0 mm.; p. 386.
FIG. 7. *Limopsis diazi* Dall, view of interior; lon. 4.5 mm.; the crenulation of the margin was indistinct on this specimen; p. 397.
FIG. 8. *Limopsis juarezi* Dall, exterior; lon. 6.2 mm.; p. 396.
FIG. 9. *Arca* (*Bathyarca*) *nucleator* Dall; lon. 6.0 mm.; p. 397.
FIG. 10. *Cetoconcha smithii* Dall, profile; lon. 18.5 mm; p. 431.
FIG. 11. *Nucula savatieri* Mabille & Rochebrune; lon. 14.0 mm.; p. 367.
FIG. 12. *Lyonsia panamensis* Dall; lon. 12.0 mm.; p. 427.
FIG. 13. *Vesicomya lepta* Dall, interior of right valve; lon. 15.0 mm. (young specimen); p. 416.
FIG. 14. External view of the same valve, about natural size for the adult.

Figures 13 and 14 were drawn by the late Dr. J. C. McConnell, the others by Miss Evelyn Mitchell.

1



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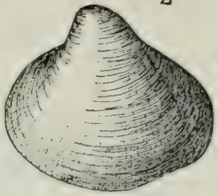

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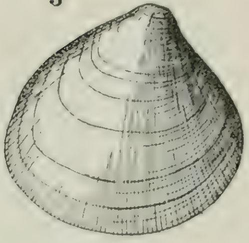

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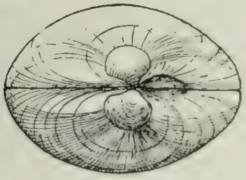

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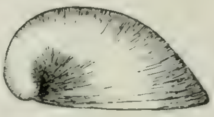

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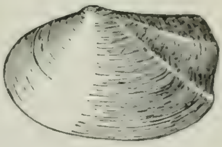

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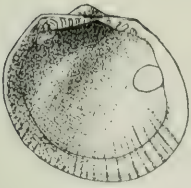

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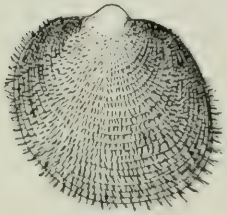

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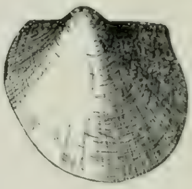

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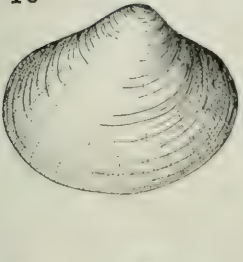

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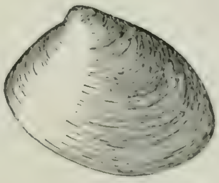

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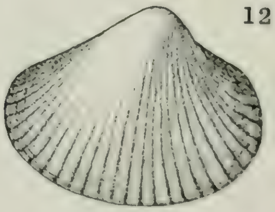

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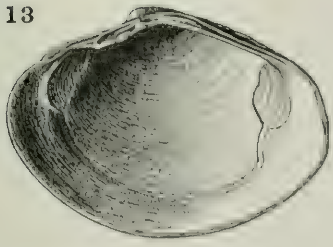

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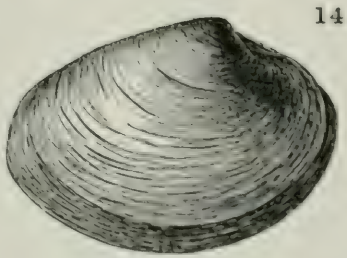
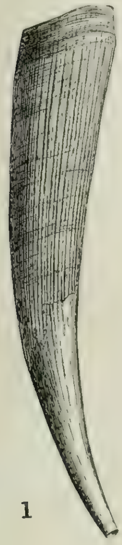


PLATE 19.

FIG. 1. *Dentalium megathyris* Dall; lon. 95.0 mm.; p. 357.
FIG. 2. *Irenosyrinx goodei* Dall; alt. 80.0 mm.; p. 272.
FIG. 3. *Cadulus albicomatus* Dall; lon. 24.0 mm.; p. 360.
FIG. 4. *? Ganesa panamensis* Dall; alt. 4.7 mm.; p. 352.
FIG. 5. *Calliostoma iridium* Dall; alt. 20.0 mm.; p. 348.
FIG. 6. *Pleurotomella (Phymorhynchus) cingulata* Dall; alt. 73.0 mm.; p. 283.
FIG. 7. *Turcicula macdonaldi* Dall; lat. 60.0 mm.; p. 349.
FIG. 8. *Pleurotomella (Phymorhynchus) argeta* Dall; alt. 43.0 mm.; p. 283.
FIG. 9. *Scaphander interruptus* Dall; alt. 33.0 mm.; p. 239.

The figures for this plate were drawn by the late Dr. J. C. McConnell.



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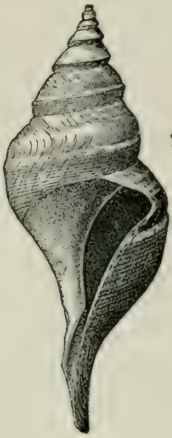

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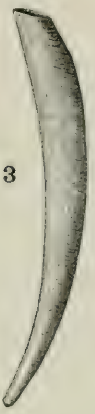

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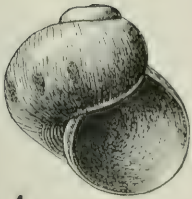

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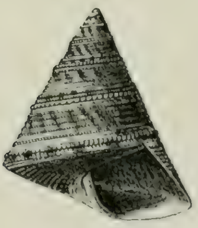

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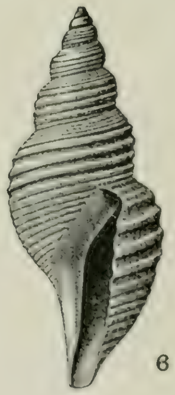

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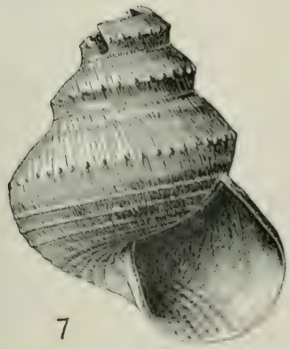

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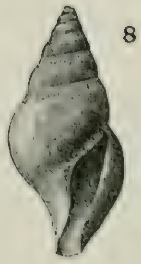

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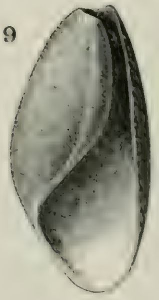

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PLATE 20.

Hydrographic sketch of the Pacific, from the Gulf of California to Northern Ecuador, with the track of the "Albatross," February 22 to April 23, 1891.

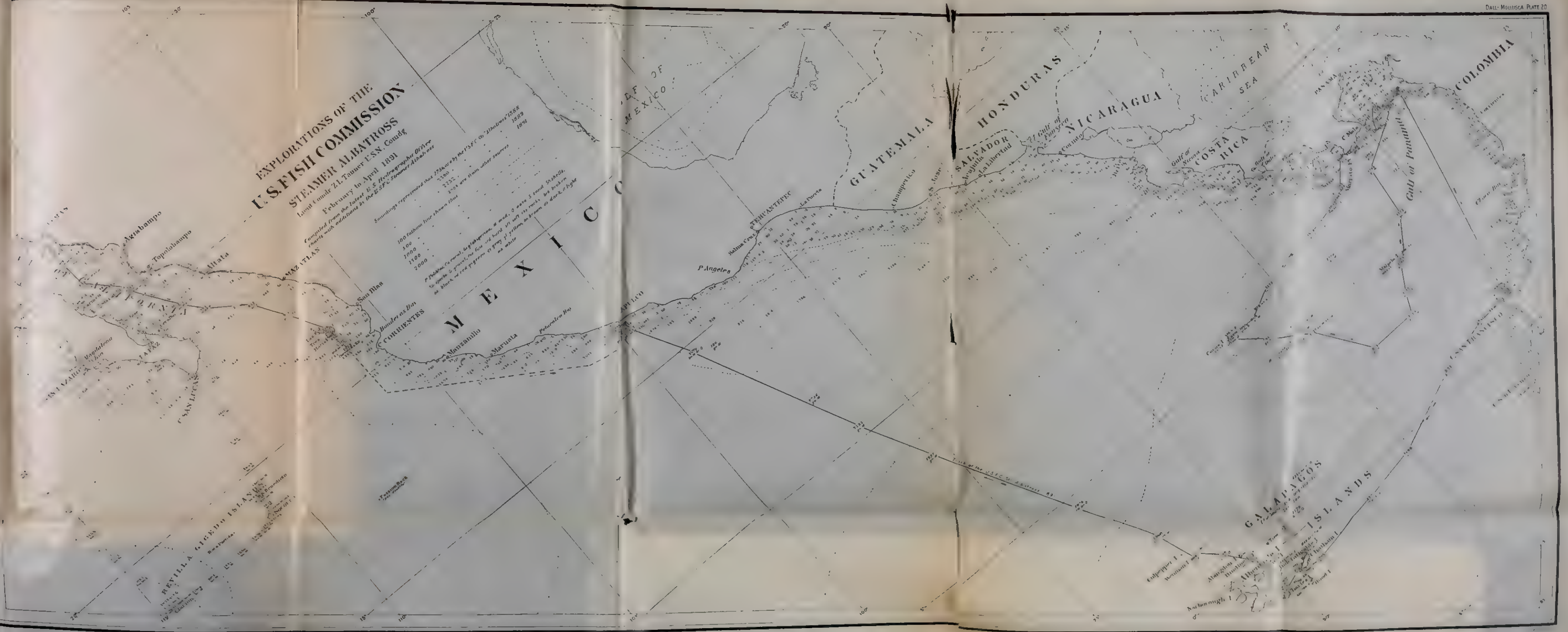

EXPLORATIONS OF THE
U.S. FISH COMMISSION
STEAMER ALBATROSS
Lieut Comdr Z.L. Tanner U.S.N. Comdg
February to April 1891
Compiled from the latest U.S. Hydrographic Office charts with additions by the U.S.F.C. Steamer Albatross
Soundings represented thus 2754 are by the U.S.F.C. Str "Albatross" 1888
2380 1889
2232 1891
1004 are from other sources
100 fathom line shown thus
500
1000
1500
2000
M E X I C O
GULF OF MEXICO
GUATEMALA
HONDURAS
SALVADOR
NICARAGUA
COSTA RICA
CARIBBEAN SEA
COLOMBIA
Gulf of Panama
PANAMA
GALAPAGOS ISLANDS
REVILLA GIGEDO ISLANDS
Agiabampo
Topolobampo
Altata
MAZATLAN
San Blas
Banderas Bay
C. CORRIENTES
Manzanillo
Maruata
Petacalco Bay
ACAPULCO
P. Angeles
Salina Cruz
TEHUANTEPEC
La Puerta
Champerico
La Libertad
Gulf of Fonseca
Gulf of Nicoya
Gulf of Dulce
C. Mala
Malpelo I.
Cocos I.
C. SAN FRANCISCO
Magdalena Bay
C. SAN LAZARO
LA PAZ
C. SAN LUCAS
Culpepper I.
Wenman I.
Abingdon I.
Bindloe I.
Albemarle I.
Narborough I.
Chatham I.
Hood I.
Charles I.
Track of the U.S.F.C. Str. Albatross 1891

PLATE 21.

Bathymetrical chart of the Eastern Tropical Pacific, with the track of the "Albatross" in 1891 in the Panamic district, in 1899–1900 in the Central Tropical Pacific, and in 1904–1905 in the Eastern Pacific.

Bathymetrical Chart

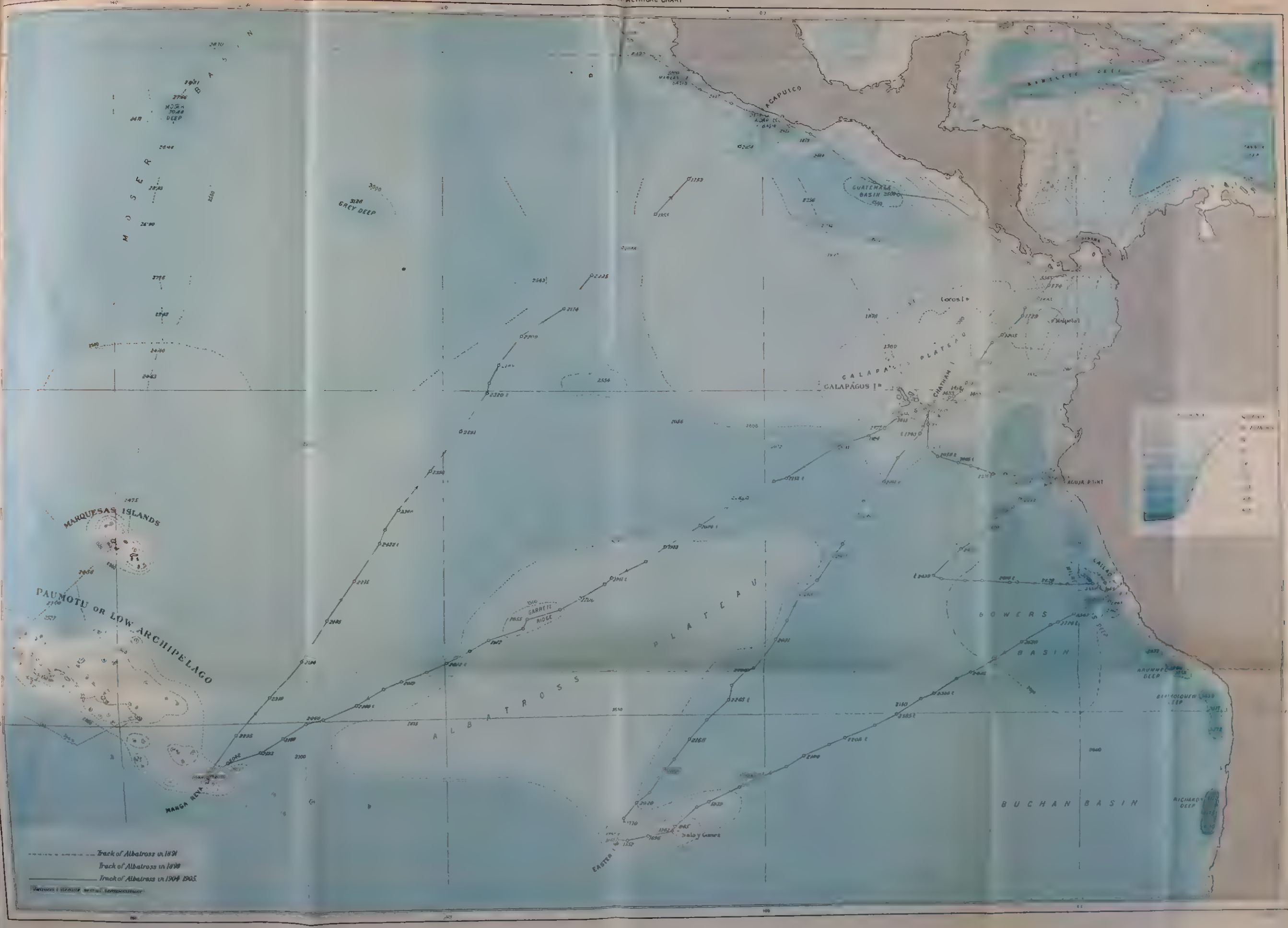
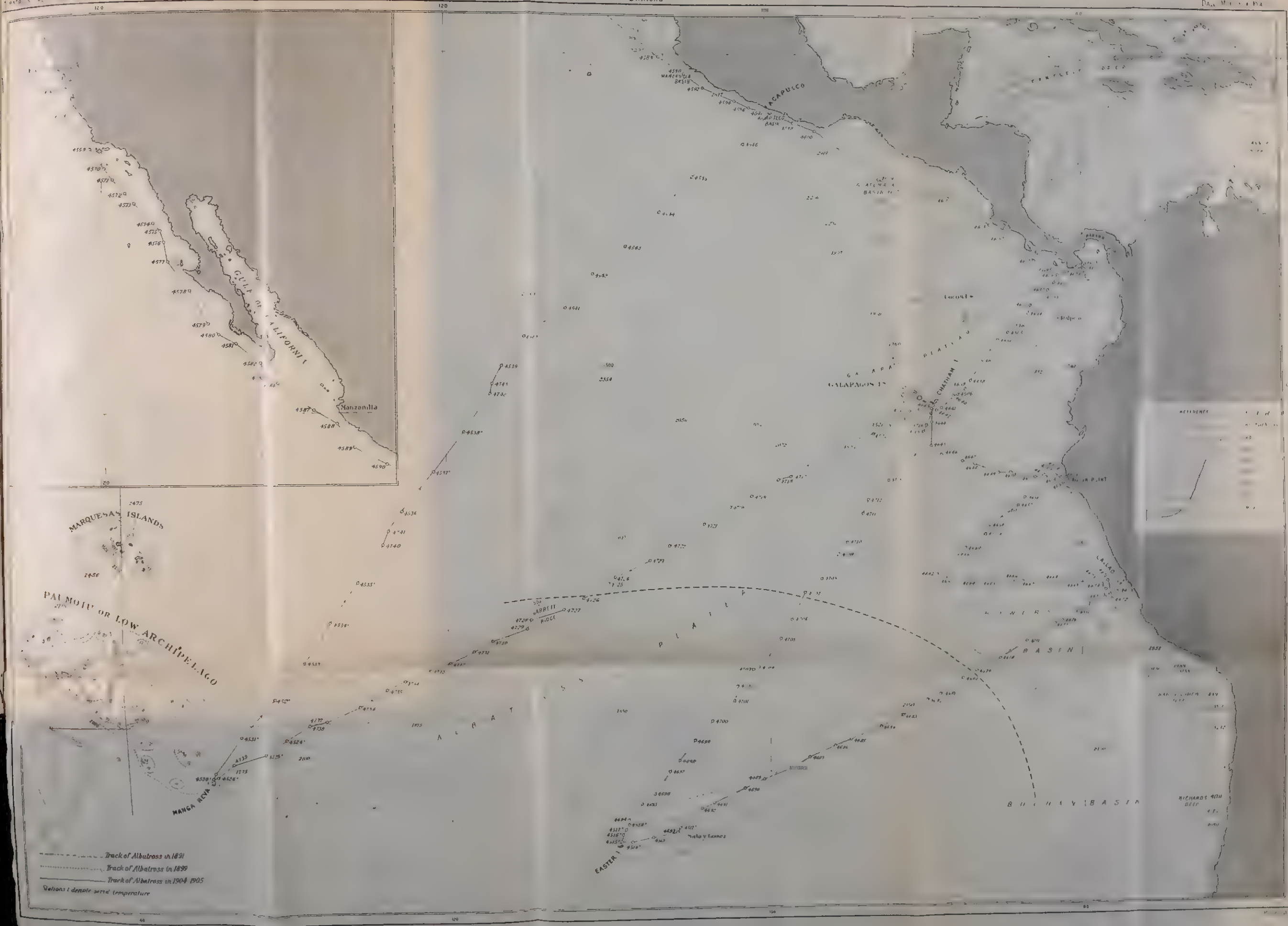

MOSER BASIN
GREY DEEP
ACAPULCO
GUATEMALA BASIN
GALAPAGOS PLATEAU
GALAPAGOS Is.
CHATHAM I.
Cocos I.
Malpelo I.
AGUJA POINT
CALLAO
MARQUESAS ISLANDS
PAUMOTU OR LOW ARCHIPELAGO
MANGA REVA
GARRETT RIDGE
ALBATROSS PLATEAU
BOWERS BASIN
BUCHAN BASIN
KRUMMEL DEEP
BARTHOLOMEW DEEP
RICHARDS DEEP
EASTER I.
Sala y Gomez
Track of Albatross in 1891
Track of Albatross in 1899
Track of Albatross in 1904-1905

PLATE 22.

Showing position of the stations occupied by the "Albatross" during her cruise in the Eastern Pacific in 1904–1905.

STATIONS


ACAPULCO
MANZANILLO BASIN
Manzanilla
GULF OF CALIFORNIA
GALAPAGOS IS.
CHATHAM I.
CALLAO
MARQUESAS ISLANDS
PAUMOTU OR LOW ARCHIPELAGO
MANGA REVA
ALBATROSS PLATEAU
ALBATROSS RIDGE
EASTER I.
Sala y Gomez
BASIN
RICHARDS BASIN
AGASSIZ BASIN
Track of Albatross in 1891
Track of Albatross in 1899
Track of Albatross in 1904 1905
Stations I denote serial temperature
120
110
100
90
80

QL
1
H3
v.43

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Biological
& Medical
Serials

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